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Coccidiosis in Rabbits

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DOMESTICATED rabbits, and this includes Belgian hares, are not as a rule liable to many diseases if the elementary principles of hygiene are practiced, but great losses occur if these are neglected, and what ought to be a profitable industry becomes a loss to the investor. In spite of their paucity in number, the ailments of rabbits kept in confinement are usually of a serious nature, often causing the loss of the whole of the stock. As the majority of diseases that rabbits suffer from are preventable or at least controllable, it is of the utmost importance that symptoms of disease be recognized as soon as they become apparent and that the correct methods of dealing with the outbreak are taken. It is suggested that as the rabbit industry is assuming important proportions, not only in the production of fancy lines but for the purpose of food production, veterinarians devote some of their energies to combating the diseases that are bound to appear in proportion to the numbers of rabbits raised. Many would-be raisers of rabbits or Belgian hares are deterred from embarking on the undertaking owing to the risk of losing their stock from what to them are mysterious ailments. Others already in the business would be only too glad to obtain advice and pay for it if the veterinarian was in a position to offer a solution of the problem. Unfortunately the diseases of rabbits are but very lightly touched upon in veterinary schools, and to cover his ignorance the veterinarian too often pretends that it is beneath his dignity to treat a rabbit. From both the economic and professional aspect, this is a mistake. The value of the rabbit as food is considerable, and from a professional point of view a veterinarian should be competent and eager to combat disease irrespective of the animal it attacks.

Coccidiosis is by far the most important disease of the rabbit, both on account of its prevalency and on account of the variety of the lesions produced. Adult rabbits are often the carriers of coccidia without showing any symptoms themselves. Young rabbits are generally the victims of the inroads of this parasite and the mortality is usually very high. In order to appreciate the full significance of the coccidia, a working knowledge of the life history is essential, and for that reason a short description follows:

The coccidia belong to the phylum Protozoa, class Sporozoa or Telosporidia, order Coccidiidae. The life cycle is completed by asexual and sexual generations. There are four genera, members of which attack mammals, invertebrates and fish. The genus which we have to consider here is the Eimeria, members of which chiefly attack vertebrates, man included.

Life Cycle of the Eimeria Cuniculi

The adult coccidium is ovoid in form and consists of a chitinous shell which is smooth and fairly thick and which at its narrowest pole shows a small indentation, the micropyle. The micropyle communicates with the granular protoplasm within the shell and is the means of ingress for

the male element in fertilization. The extreme length is 40 to 49 microns, width 22 to 28 microns. In unfertilized adults the protoplasm fills the shell but when fertilization has taken place the protoplasm collects into a spherical mass in the center of the shell and develops a central nucleus. This constitutes an oocyst which is the last stage of development in the liver. The oocysts pass into the intestine from the liver and are evacuated with the feces. Under favorable conditions of warmth and moisture, the protoplasm of the oocyst splits up into two and then four sporoblasts. Each sporoblast then becomes elongated in form and becomes a sporocyst, which subsequently undergoes division to form two sporozoites, the remaining unused small mass of protoplasm being termed the residual body. There are thus developed eight spores or sporozoites, or falciform bodies as they are sometimes termed, from one fertilized adult. The whole process takes about a week, and this knowledge is of practical importance since if the hutches are cleaned out twice weekly, no sporozoites can be ingested by other individuals and the disease spread. The development of the fertilized oocyst must attain the sporocyst and sporozoite stage outside the body since if ingested before that has taken place, development ceases. If the sporocyst containing the sporozoites be taken into the body of a rabbit with the food, the envelope is dissolved by the pancreatic juice and the sporozoites set free. The sporozoites are actively motile and penetrate the epithelial cells of the intestine or bile ducts, entering the protoplasm of the cell and pushing its nucleus to one side and assuming a spherical shape. This sphere which develops at the expense of the invaded cell is now called a schizont; it has no enveloping membrane but contains a large alveolus or vacuole. By a process of asexual multiplication, the schizont produces from ten to fifteen nucleated and falciform bodies, which again subdivide into daughter cells, which arrange themselves around the periphery of the mother cell, presenting the appearance of the quarters of an orange. The schizont then splits up, and the contents which are now termed merozoites are set free. The merozoites are motile and wander free in the intestine; some perish but others invade fresh cells and repeat the process of schizont formation by which other merozoites are produced. It is this repeated invasion of cells and rapid multiplication of individuals that accounts for the rapid development of the disease and the lesions produced.

The above process is termed schizogony. There appears to be a limit to the duration of schizogony, and when this is reached the merozoites after invading the cells become transformed into male and female elements, respectively termed microgametes and macrogametes. The macrogamete develops slowly from the merozoite. Its nucleus contains a karyosome which later becomes expelled. The granules of its protoplasm become ranged around the periphery and form an enveloping membrane with a micropyle. At this stage it is ovoid in form and escapes from the cell and lies on the surface of the epithelium and is ready for fertilization.

The microgamete is produced in a slightly different manner. The merozoite loses its enveloping membrane and granular protoplasm. Its nucleus contains a large karyosome. The nucleus by subdivision becomes split up into a number of daughter nuclei which become flattened, elongated and comma-shaped and finally develop two flagella. The microgametes, which bear a great resemblance to the spermatozoa of the higher animals, become detached from the parent merozoite, which in this stage is called a microgametocyte, and become free moving organisms. Chemotaxic influence of the macrogamete attracts a microgamete which enters the micropyle of the macrogamete and fertilizes it. The micropyle closes immediately the microgamete has entered so that only one male element is concerned in fertilization. The fertilized macrogamete is now termed an oocyst, which on being passed out of the body repeats the cycle which has just been described.

Modes of Infection

From the above description of the rapid development of the organism, one can understand that once introduced into a rabbitry the disease may spread with extreme rapidity. As before stated it is introduced into a rabbitry by infected rabbits, hutches, food, traveling baskets and crates, etc. The disease attacks rabbits of all ages but young rabbits from the ages of four to

eight weeks old appear to be the most susceptible. It may also attack the young before weaning. Warm weather and a humid atmosphere are most favorable for its spread, and it is not so prevalent in very hot and dry, or during dry and frosty weather. Damp and wet living quarters and runs are most favorable to its rapid spread, partly because such conditions are favorable to the development of the organism and partly owing to the lowered resistance of the animals that such conditions produce.

Symptoms

The symptoms depend greatly on the intensity of the invasion and also whether the liver or the intestines are the most heavily infested. In any case the symptoms so merge themselves into one another that it is not always possible to determine the different degrees of infestation as described in the literature on the subject, but for convenience of description, it is advisable to differentiate hepatic, intestinal and nasal coccidiosis.

Hepatic Coccidiosis

In light infestations symptoms sometimes do not develop and the condition is found only post mortem. When the infestation is heavy, however, the animal becomes dull, shows lassitude, appetite poor, fur dull, rough and easily pulled out, gradually becomes emaciated, the abdomen ascitic (pot belly), staggering gait, often convulsions and death after a few weeks. There is always a profuse diarrhea and the feces are swarming with parasites.

Intestinal Coccidiosis

When the intestines are heavily infested the disease usually takes a more acute course, sometimes carrying off young individuals in a few hours after symptoms showing dullness, apathy, anorexia and coma. In these cases the disease may be mistaken for hemorrhagic septicemia, and as coccidiosis is often coexistent with that infection, it is possible to obtain a definite diagnosis only by bacteriological methods. In less acute cases, the symptoms are dullness, apathy, anorexia, emaciation, diarrhea and marasmus. In more chronic cases the abdomen becomes ascitic as no doubt the liver is also implicated and there is a coexistent infestation of the liver and the intestines.

Nasal Coccidiosis, Malignant Catarrh or Snuffles

This seldom occurs without intestinal coccidiosis being present at the same time. It may, however, be coexistent with infectious rhinitis and influenza. The nasal canals probably become infected from the dung if the droppings are not kept cleared away when the disease is present in the intestinal or hepatic form. The symptoms are dullness, appetite poor, fur dull and and rough, sneezing and a discharge from the nose, at first serous and watery but later becoming mucoid and purulent. The nasal discharge glues the nostrils together and soils the fur on the breast and forelegs. There is profuse salivation which wets the breast, shoulders and forefeet. There is persistent coughing and sneezing and the temperature gradually rises to 104° F. to 105° F. The breathing becomes difficult and later on abdominal with much panting and pumping. Emaciation and great weakness set in and death during convulsions terminates the animal's sufferings.

Post-Mortem Lesions

The blood is pale and watery, the tissues anemic and pale. The liver is found enlarged showing on its exterior a number of raised whitish yellow nodules varying in size from that of a millet seed to that of a peanut. As a rule the whole organ is involved, but in some cases only one lobe may be affected. On sections of the liver the nodules are found to be distributed throughout the hepatic parenchyma, sometimes to such an extent that there is very little left of the liver substance. The nodules contain a whitish, purulent fluid in which are found coccidia, degenerated epithelial cells, fat and crystals of cholesterin. The nodules are in fact simply dilatations of the bile ducts. The lumen of the bile ducts may be crowded with coccidia in various stages of development, broken down cells and leukocytes. The epithelium of the ducts is found to be invaded with the parasites and the submucosa infiltrated with small round cells. Occasionally the gall bladder is also invaded causing thickening of its walls and damage to the cells of its lining epithelium. In very chronic cases the liver may become completely cirrhosed with large cyst-like cavities which are the remains of degenerated and obliterated bile ducts.

In the intestine the mucous membrane is found studded with nodules of punctiform appearance, and in a state of catarrhal inflammation, covered with an exudate and showing small areas of ulceration. The exudate contains coccidia, degenerated epithelial cells and fat globules. The submucosa is in a state of inflammation and round-celled infiltration and may contain coccidia. Immature coccidia may also be found in the mesenteric glands.

In nasal coccidiosis the nasal and pharyngeal mucous membrane is found to be in a state of catarrhal inflammation covered with an orange colored exudate which contains coccidia. The eustachian tube may also be invaded and the external auditory canal, the middle ear and the tympanum.

Differential Diagnosis

Coccidiosis may be mistaken for tuberculosis, pseudo-tuberculosis and cysticercosis, and the only reliable means of differentiation is by the microscope, although the fact that the lesions are confined to the liver and intestine is not suggestive either of tuberculosis or pseudo-tuberculosis, both of which diseases being found to be more generalized.

Diagnosis during life is determined by the clinical symptoms and the detection of the parasite during life, but in the cases of nasal coccidiosis the fact that it may be only a complication of some other disease should not be lost sight of.

Treatment

In dealing with rabbits, it should always be remembered that prophylaxis is more productive of results than treatment.

To keep rabbits healthy, their hutches must be kept scrupulously clean, the litter changed daily and the hutches themselves thoroughly cleaned out at least three times a week. If this is done much is accomplished in preventing the infection of the inmates with the ova of the Eimeria cuniculi. Rabbits should be kept dry and should not be exposed to draughts. They should receive a plentiful supply of fresh air from overhead ventilation. They should be protected from strong winds and from the full glare of the summer sun.

The purchase of old or second-hand hutches is undesirable because of the danger of introducing disease into the rabbitry, and in any case these, if they are bought, should be thoroughly disinfected before use. The ova of the Eimeria cuniculi are extremely resistant to ordinary disinfectants and the hutches should first of all be scrubbed out with boiling water and strong lye, then rinsed with boiling water and finally dried with a gasoline blow torch. Particular care should be taken to scrape out all cracks and crannies and to ensure that the boiling water penetrates to all these recesses.

It should be noted that a very large percentage of adult rabbits are carriers of coccidiosis, even if showing no symptoms of disease, and on that account, it is undesirable that young and adult rabbits inhabit the same hutch or run and, for the same reason, that the hutches be kept free of accumulations of feces.

Medicinal treatment consists of iron tonic and intestinal antiseptics, stimulants as required and cerebral sedatives if brain symptoms develop. Saccharated carbonate of iron should be given in from five to ten grain doses. Tincture of catechu, sulphocarbolates of calcium, zinc and sodium, and Dover's powder, are especially indicated, and sodium bromid as a cerebral sedative.

The appetite should be tempted with a varied and sustaining diet, but fresh, wet, green stuff should not be given; it should be allowed to wilt before being fed. In fact, fresh, wet, green stuff should not under any circumstances ever be fed to rabbits, as for some unexplained reason it seems to favor the invasion of the coccidia. There is no scientific explanation for this fact, but the fact remains and such diet should be avoided.

The bodies of rabbits dying from coccidiosis should invariably be cremated, not fed to dogs or cats, or left lying on the manure heap, and the dung from infected animals should not be used as fertilizer.

An election was held in Clay county, Mississippi, on September 2nd, to determine whether the county should undertake tuberculosis work among dairy cattle. This is said to have been the first election of this kind held in the United States.

At the fortieth annual convention of the Ontario Veterinary Association, held at Toronto, August 6th and 7th, the members declared war on quacks and recommended that legislation be passed requiring the registration of all veterinarians and the investigation and prohibition of all privately conducted veterinary correspondence schools.

The Future Veterinary Corps of the Army

By MAJOR C. D. McMURDO, Veterinary Corps, Chicago.

WITH the prospect of the adoption during the fall months of legislation for the reorganization of the army, it would seem wise for the veterinary profession to consider carefully some of the possibilities which this legislation may hold for veterinarians in the military establishment.

Under the provisions of the national defense act of June 3, 1916, the army veterinarians were given for the first time the rank of commissioned officers and the veterinary corps made a part of the medical department. It is understood that this move was with the tacit consent of the Quartermaster General. The work of transferring the officers in their new affiliation was barely completed when the United States entered the war and no organization had been completed. Consequently the veterinary corps under the medical department is only about two years old. With all the stress of actual warfare during this period it has, of course, been practically impossible to organize and develop the veterinary corps along the broad lines which could be followed in quieter days of peace. Emergencies had to be met as they arrived, leaving many questions of policy and procedure to be worked out when time should permit.

Notwithstanding these facts there has been apparent in certain quarters considerable agitation as to whether change in the affiliations of the veterinary corps is not advisable when congress legislates for the new army. Several moderately well defined plans appear to have been suggested.

First. That the veterinary service be organized and kept a separate corps.

Second. That it be united with the remount organization under a common head into a new corps.

Third. That it become a part of the quartermaster corps.

Fourth. That it remain a part of the medical department as at present.

In the nearly thirty years that I have been connected with the army as a veterinarian, and more particularly during the past eighteen months in which I have served in the capacity of a general veterinary inspector, I have had an opportunity to study the work of the corps, and perhaps understand its possibilities as well, or better ,than anyone who remained on this side of the Atlantic, and the arguments for and against these plans present themselves to me in the following order:

There is perhaps no more pleasant vision than that of the veterinary corps as an independent organization, with its own brigadier general and staff, its own training camp and school, its enlisted personnel, and its duties clearly defined, with every member of the corps working for the common good. However, no one who has had any experience with the military establishment, believes this vision can become a reality.

Military history shows a constant repetition of the struggle for existence by the small organization and for supremacy by the larger one. "The survival of the fittest" has been written many times over in the army. It is doubtful whether as a separate corps the veterinary organization would last a fortnight. Perhaps a typical illustration of what is meant may be found in the history of the old commissary department. This department had its birth during the Civil War, when, because of the need for greater efficiency, the commissary was separated from the quartermaster department. It had its own commissary general and as an individual organization it rendered excellent service. It gave its officers and men training in its particular line of work and developed a high degree of proficiency. In 1912 it was absorbed by the quartermaster corps (together with other staff departments), the principal argument for such absorption being that the quartermaster corps could by adding one column to its books, carry on the work of the commissary department along with its own. No sooner was the absorption of this department completed than its dissolution was begun. Its educational work has been discontinued, its *esprit de corps* has disappeared. Practically all that remains today of the commissary department, is the crescent in red which appears upon cases containing subsistence supplies.

The possibility of the union with the remount organization into a new corps seems to have been the subject of discussion in the A. E. F. It is understood this plan contemplates the withdrawal of the remount branch from the quartermaster corps, and by union with the veterinary corps under a brigadier general, form a new organization or corps. It has been claimed that the work of the remount service and the work of the veterinary corps are so closely associated that they might well be united under a common head. Except for this union at the head, it is contemplated that each organization would function along its own particular lines.

Two points of objection to this plan present themselves.

It cannot be conceived that the quartermaster corps would allow the withdrawal of the remount division, and the removal of its work from the quartermaster corps as it exists at the present time. Quartermasters and public animals have been associated since the beginning of military history, and the present policy of the quartermaster corps is to extend its field of operation rather than to contract it, and it is not believed that it would look with favor upon the withdrawal of the remount service.

Although the remount service and a certain branch of the work of the veterinary corps are closely associated, the same is not true of all of the veterinary service as regards the animals of the army nor of that other and important branch of the veterinary service, the meat and dairy inspection. Just how this branch of the veterinary service is to be co-ordinated with the remount work is not clear.

The veterinary service is quite essential to the successful functioning of the remount service but the reverse is not true and a veterinary service is maintained at many points quite independently of the remount service. One unacquainted with military methods might, with excellent logic on his side, argue that rather than allow the veterinary corps to be made a means of enlarging the powers of the remount service, the veterinary corps might well be extended by assigning to it and to its officers the purchasing powers at present reposed in the remount service. It is, of course, unnecessary to point out that the veterinary corps must from the nature of things function as a professional staff corps and not as a purchasing or procurement branch.

It might appear to the casual observer that the veterinary corps would render the best service to the government by being affiliated with the quartermaster corps, for the reason that its work lies along the same general lines. All animals purchased for the military forces are purchased by the quartermaster corps, but pass the joint inspection of quartermaster and veterinary officers. Public animals, while in charge of quartermaster officers, are supervised and treated by veterinary officers with a view to preventing inefficiency and relieving disability. All purchases of meat food products for the military forces are made by quartermaster officers, but their inspection is placed under the control and supervision of the veterinary officers. Forage and grain for the public animals, purchased by the quartermaster corps is, or should be inspected by veterinary officers. This similarity of duties, has warranted the conclusion that these two corps might well be amalgamated.

There are, however, these general reasons why such a procedure would not work to the best advantage, either of the veterinary corps or the military service. The inspection of animals and of meat and dairy products and of forage, should be conducted as separate and distinct from the purchase of these articles. In other words, the purchasing office should not be concerned in the determination of the quality of the supplies or animals offered. The inspecting officer should not be interested in the price paid. The accepted and published specifications are to be the sole guide in the determination of acceptable supplies or animals.

Because of the absence of professional literature, laboratory equipment and educational institutions in the quartermaster corps, and the well known tendency of the layman to belittle professional training, the tendency of the corps under such an affiliation would, it is thought, tend toward a lowering of standards, rather than a raising of them. If affiliated with the quartermaster corps, quartermaster officers would determine the qualifications of the veterinarians eligible for commissions. One needs but to glance back over the history of the veterinary organization at

the time of the Spanish-American War, to find examples of the haphazard method by which the veterinarians were chosen for the military service. At that time a number of veterinarians employed by the quartermaster corps were unskilled, uneducated non-graduates.

If the reader has any doubts as to the correctness of this statement, let him consult with some of the older veterinary officers in the present corps.

As viewed by the onlooker the quartermaster corps is a tremendously large and constantly changing organization. Beginning with the absorption of certain staff departments in 1912, it has during the past emergency undergone a series of transformations. Within itself there are smaller departments and branches. The director of finance and the director of traffic have been separated to a degree. The motor transport corps has been an offshoot, in fact, the entire corps may be compared to a huge maelstrom, in a continual ferment, and where the veterinary corps would end once it becomes a part of this mass, is difficult to conceive.

The principal objection to the present plan of having the veterinary corps under the medical department, may be found in the fact that the veterinary corps functions under the control of medical officers.

The answer to this objection is that at the present time we have not a sufficiently experienced personnel from which to draw our administrative officers and so long as the veterinary corps is a part of the medical department it must be administered by representatives of the Surgeon General. It is confidently believed, however, that as the veterinary officers become better qualified in administrative duties, they will be allowed a higher degree of authority and experience less and less official interference from medical officers.

Under either of the two plans outlined, however, the veterinary corps would operate under outside officers.

It seems then for us to choose in our own minds at least whether we will remain under the medical officers or be placed under non-professionals.

In consideration of these two controls, it is suggested that you ask the men who have had experience under both departments, whether they would prefer to work under the quartermaster corps, or under the medical department.

Remember that for more than twenty years, a large number of veterinarians in the army had been a part of the quartermaster corps. In that twenty years they have been granted the magnificent salary of $100.00 per month, and denied the privilege of wearing the army uniform, and the veterinarians in other branches of the military establishment have attained the lofty height of donning the army uniform, drawing the pay and allowances of second lieutenants, mounted, but denied the rank.

Preventive veterinary medicine is closeiy allied to preventive human medicine. The two sciences proceed along parallel lines and the results of the investigations of one are frequently of valuable assistance to the other.

The work of the veterinary officers in connection with meat and dairy inspection, is essentially sanitary. The sanitation of the army is a part of the work of the medical corps, and by extending the training of its members, they could take over the work at present as done by the veterinary corps. With the veterinary corps a part of the medical department, there will be no occasion for such an extension, but with the veterinary corps as a separate organization, it is not difficult to imagine conditions under which such an extension might be given serious consideration. The veterinary corps has had limited experience in organization and administrative work. This is through no fault of its members, but due to the lack of opportunity. To endeavor to administer its affairs with inexperienced men surely would result in disaster. Some experiences to illustrate this point might be cited from the history of the corps during the past few years.

It was only through the untiring efforts of the Surgeon General that the rank of major was restored in the veterinary corps. That the leading and patriotic members of our profession, who gave up lucrative practices and comfortable homes, some even their lives, to serve their country in her hour of need, were not compelled to serve as second lieutenants, was due to the vigorous insistence of the Surgeon General, who appreciated their need of greater rank.

In my work as general veterinary inspector during the war, I have been fre-

quently in conference with officers of the medical corps regarding sanitary conditions in the camps. I have invariably received the heartiest co-operation from them as well as many valuable suggestions. In several instances I have had to solicit their aid in convincing the commanding officers that suggestions made by the veterinarians were practical and necessary to the health of the command and should be carried out. Without their assistance it would have been a very much harder, if not impossible task to have established and put in force regulations governing the thorough inspection of all meat, meat products and dairy products consumed in the various cantonments and army camps.

The medical corps has always stood for higher education and a strict adherence to professional ethics. Associated with them we have the benefit of their extensive libraries and laboratories, as well as their instructors. As a strong argument in favor of the veterinary corps remaining a part of the medical department, it is only necessary for the reader to compare the results accomplished by the corps in the United States with what was accomplished across the water, where it seemed that chaos reigned, not through any fault of members of the veterinary corps, as they knew what should be done and tried to accomplish results, but were hampered in their efforts through being placed under the quartermaster corps and having a layman at their head, while in the United States, under the interested and scientific direction of the Surgeon General, they not only worked in perfect harmony but developed an organization which secured results.

An efficient corps has been built up in the past two years. The material to work with was excellent, but it was entirely unorganized and woefully ignorant regarding military system and discipline.

In presenting these views to the veterinary profession, I have only one thought in mind, namely: that in considering this very important matter, important not only to the veterinary corps but to the profession as a whole, we may decide upon a plan which will meet with the approval of the majority of the members of the profession. No plan is acceptable which has not for its basic aim, the building up of a veterinary corps composed of scientific veterinarians of the highest professional and personal qualifications—a corps with professional standards second to no other and in every way a credit to its members, to the army and to the profession. We shall never be unanimous in details, but we should be united upon a general plan for the future. It is hoped that present grievances or prejudices will not be allowed to influence our decisions. Apparently the future of the veterinary corps promises much if we remain with the medical department. We shall share in the fruition of its plans. The Army Medical School will be open to veterinary officers. Its laboratories contain the veterinary section. Its training camps make provision for its officers and enlisted men.

With the officers and men of its three corps mingling thus intimately, in class rooms, laboratories, libraries, and camps, much will be done for the veterinary profession, in a professional, educational and social way. I believe in this direction our hope for the future lies.

Much has been accomplished under the medical department in the last two years. Shall we reject all that we have accomplished, and start out on a new and untried venture? I sincerely hope not. I feel sure that any member of the profession giving this matter mature consideration will concur in my opinion that the veterinary corps will attain the best results, both for the government and for themselves, to continue as at present in close affiliation with the medical corps. I will venture to predict that after the continuation of the present affiliation for a few years, the results will be so excellent and so acceptable to the veterinary profession as to have completely and for all time obliterated future attempts to bring about a change.

BLATTENBERG GOES TO SASKATCHEWAN

Dr. J. H. Blattenberg, of Lima, Ohio, called on Chicago friends recently enroute to Saskatoon to attend a three-day meeting of the provincial veterinary association of Saskatchewan.

The Indiana state livestock sanitary board at a meeting on July 22nd increased the salary of Dr. T. A. Walsh, of Brazil, quarantine chief, from $1,800 to $3,000. Dr. Walsh will have his headquarters in Indianapolis. Russell Pierce, of Indianapolis, was appointed an assistant inspector at the local stockyards with a salary of $1320 a year. Dr. L. A. Rav. Quincy, was appointed head of the state district in which he lives, to succeed Dr. Walsh.

Our Method of Garbage Disposal*

By E. C. W. SCHUBEL, D. V. M. Supt., Municipal Hog Farm, Lansing, Mich.

The question of garbage disposal has been a serious one for years, not only in Lansing, but in other cities as well. Various methods have been tried out. The burying of it was found too costly. Having it disposed of by private concerns under contract has often failed. Not until the present system of disposal under municipal control was inaugurated did the garbage question begin to be less troublesome. I believe every collection system should be municipally controlled.

The method of collection being carried out in this city is what may be called the "can collection" system,—the collector takes up the full can and leaves an empty one. This system is an advantage to the householders because they have no cans to wash, but is undesirable to the city from the standpoint of economy. It costs the city more than $1,500 a year to wash and disinfect the cans. The can collection has another disadvantage because a great many householders are very indiscreet in what they put into the garbage can. They place such articles as glass, broken crockery, floor sweepings and tin cans into the cans with the garbage. This cannot be detected until the cans are emptied at the disposal place.

Handling the cans so often causes a rapid depreciation. The city is buying the cans at present from funds derived by making a rental charge of $1.00 per can per year. Many cans will not last a year. Freezing weather causes the greatest depreciation on cans.

A tank collection which is being contemplated before the next fiscal year will eliminate this mixture of garbage and rubbish, decrease the cost of collection and give more frequent service.

On account of the increase of requests for service since the close of the war due to the increased activity in building operations, the equipment is so limited that only weekly collection is being given to the residential sections of the city while daily collections are given to the restaurants, hotels, cafes, and other eating places.

The collection is made entirely with motor equipment. It includes one Duplex 4-wheel drive truck with a three and one-half ton capacity, with a trailer of like capacity. When the truck is used for collection purposes, it will carry from 150 to 200 cans, but when used for transporting the cans of garbage from the city to the farm it will haul from 350 to 500 cans when using the trailer. This mode of transporting the garbage is used in winter or when the roads are impassable for the smaller trucks. The equipment also includes two 1-ton Ford trucks with a capacity of 55 cans each; two 2-ton Reo trucks with a capacity of 115 cans each; and one 1-ton Republic with a capacity for 60 cans. To this equipment there will be added one or more trucks during the coming year. On the Duplex truck, three men are used for collection. On the other trucks only two men are used. At the present time, the collection is being made with eleven men.

The service is becoming more general as those people living in the outskirts of the city are beginning to ask for service. It shows that people are beginning to be educated to want better sanitary conditions.

The garbage from this city is being fed to hogs. This method of disposal has been highly satisfactory and very profitable considering the investment.

The idea of feeding the garbage to hogs was brought to a realization by a number of our public-spirited citizens, including former Mayor J. G. Reutter, Alderman Lewis Neller, Alderman John McClellan and Ex-Alderman Frank Young, who backed the proposition with their money.

After the proposition proved a financial success, they turned over to the city on Nov. 1, 1917, a herd of hogs numbering 213 valued at $4,000 and several buildings valued at $1,000. Since that time additional buildings and equipment costing over $1,200 have been purchased, the herd increased to 400 hogs valued at over $12,000 and $5,000 in the treasury with which to buy more hogs. Building up the herd has been entirely dependent upon the profits derived from the sale of hogs.

*Read before League of Michigan Municipalities, Lansing, Mich., June 26, 1919.

A report compiled recently by the city comptroller showed that on May 1, 1919, the project had made a profit of about $8,500. This was based on a price of about $18.00 per hundred pounds for the hogs, when in reality the hogs could have been sold for $20.00 per hundred pounds. If a sale had been made of all hogs on hand, the profit for the past fiscal year would have been more than $10,000.

As soon as the herd can be increased to 800 or 1,000 head and kept at about that number, the profit from feeding will be from $12,000 to $18,000, dependent, of course, upon a high price for hogs. There is every indication that the demand will be enormous from the European countries for years, as it will take those countries a number of years to build up their herds again. Those cities boasting of other methods of disposal cannot show much greater profits when the investment is considered.

When a farm is purchased where the feeding may be done upon the ground, the uneaten portion of the garbage will be converted into fertilizer by plowing it under the soil and then sowing a crop on this ground. This will increase the profits from garbage disposal.

The garbage is fed as it comes from the city directly to the hogs upon the ground or upon cement platforms. Feeding upon the ground is preferable as upon platforms a certain amount remains uneaten and so must be hauled away while that which remains upon the ground uneaten may be plowed under.

The test of the practicability of the feeding method of disposal is the selling possibilities of the pork produced. There is no benefit in feeding if the pork is unfit for food or if a popular prejudice will prohibit it from selling freely. There is undoubtedly a prejudice in the public mind against "garbage"—not particularly against garbage-fed pork, nor reduction or incineration plants, but against the word "garbage" and anything connected with garbage. One might say its disposal was regarded as an illicit business. It is not strange, therefore, that there is so little general knowledge of the possibilities of garbage utilization and particularly of the feeding method.

If garbage-fed pork is inferior to grain-fed, the price paid by the packers, who are naturally adverse to paying full price for an inferior product, should indicate the fact. When selling hogs on the Detroit market, they have always brought the top of the market. I have never seen any market which discriminated against hogs fed on garbage. When cases of "softer" pork have been noted, it has generally been found that the animals were improperly raised.

There is no theoretical reason why garbage should be bad for hogs. Even putrefying materials may be transformed into delicious human food; for example, lobsters, crabs, shrimp, etc., feed almost exclusively on decaying fish; and the common barnyard chicken will eat and thrive on almost all kinds of so-called filth.

In the eating of garbage-fed pork, one will find the meat much sweeter in taste than the corn-fed pork. An objection often raised to garbage-fed hogs is that such hogs are likely to be infected with trichinosis or tuberculosis. There are no data available to support such claims; isolated cases have been found, as with grain-fed stock, but this is no evidence that garbage-fed hogs, as a class, are any more susceptible to either trichinosis or tuberculosis than grain-fed.

About one hundred animals, ranging from pigs to big sows, will eat a ton of garbage per day. This means an average of 20 pounds per animal per day. At this time of the year, hogs make very good gains in weight. Under proper conditions, they will gain from ½ to 1 pound, and even more, per day. A carload marketed in Detroit last week (middle of June) gained a little more than 100 lbs. from the middle of February to the 19th of June or about 125 days. This time included some very bad weather for hogs.

Householders should be required to keep garbage free from cans, papers, sawdust, oyster shells, glass, etc. Garbage mixed with any of these foreign materials is refused collection or the can is taken up and no service given. Numerous losses can be traced to such foreign matter, particularly such finer particles as readily become embedded in edible materials. Two objects which find their way into the garbage can in considerable quantities are the very thin glass from electric-light bulbs and phonograph needles.

Undoubtedly a great deal of the diffi-

culty with mixed material is due to carelessness, but the admixture of the objects mentioned above could hardly be due to carelessness. I call that a Hunnish trick. If the householder could imagine the tortures suffered by the unfortunate animals when their intestines are punctured and torn by the sharp points of glass or needles, they would join the humane society and help the city in eliminating this nuisance.

There is no sorting of garbage done on our farm. All hogs get an opportunity to get some of the garbage from eating places. Hogs make the most rapid gains on garbage coming from eating places as they have the greatest variety of refuse food.

In the winter, all the cans are placed in the boiler room where they are allowed to thaw out before the garbage is placed upon the feeding platforms or upon the ground. Frozen garbage is unsafe to feed.

At the farm, we have always fed raw garbage in preference to cooked garbage. In the first place, a sterilizing apparatus could be installed only at considerable expense; secondly, cooking destroys a greater part of the food value of garbage. Sterilization of garbage destroys the opportunity for selection. Hogs will balance their own ration much better than man is able to do. Cooking also incorporates objectionable matter with the edible garbage.

It is not necessary to supplement the feeding of garbage with grain. It would not be economical nor would there be any particular advantage gained in the quality of the pork or the price paid.

Feeding small numbers in separate pens is preferable. This prevents piling up in the winter time.

There is no attempt to feed any particular breed of hog. There have been more losses among white hogs and the least among the red ones.

Raising pigs for feeding upon garbage should be entirely divorced from that part of the farm devoted to feeding of garbage. Hogs should weigh at least 100 pounds before they are placed exclusively upon the feed of garbage. Most of the feeders are bought in the larger stock-yards where a better selection can be made.

The feeding of garbage has its discouraging features as well as those of an advantageous nature. Hog cholera used to be the cause of great losses among hogs feeding on garbage, but this can easily be prevented by the serum-simultaneous method of vaccination. No hogs are placed upon the farm until they have been treated with serum and virus. The greatest losses have been due to hemorrhagic septicemia, a form of contagious pneumonia which is usually brought into the herd through the introduction of new stock from stock-yards which always are infected premises. This disease can be prevented to some extent by the use of bacterins. Other losses occur from salt poisoning, vegetable poisoning, ptomaine poisoning, and mineral poisoning. Some of the losses are due to the carelessness of the householder.

Unfavorable sanitary conditions have been the cause of losses, that is, the deep mud and filth in which hogs have to wade during the rainy season or in the breaking up of the ground in the spring when the frost leaves the earth in a muddy condition, cause the hogs to become more susceptible to disease, especially respiratory troubles.

Sandy soil which allows the escape of the water and keeps the feeding ground free from mud is the most desirable for feeding conditions. Hogs fed on sandy soil made such gains during the past few months that they were ready for market about one month sooner than those fed upon the clay soil or upon the feeding platforms.

In summarizing, the following comparisons of garbage fed hogs with those fed grains may be made:

1. Garbage-fed hogs show a slightly greater shrinkage in long shipments than grain-fed.

2. Garbage-fed hogs dress away very little more than grain-fed.

3. With proper management, the meat produced is equal, and cannot be distinguished from that of grain-fed hogs.

4. Garbage-fed hogs are exposed to cholera constantly so immunization is indispensable.

5. Cholera in garbage-fed hogs may be associated with secondary infections but can be controlled by immunization.

6. Garbage-fed hogs are not peculiarly susceptible to trichinosis and tuberculosis.

The secret of success with garbage-fed hogs is, as with grain-fed hogs, largely one

of management. The man behind the hogs is a prime consideration. It requires hard work, no little knowledge of hogs, and a large amount of common sense to raise garbage-fed hogs. Cities undertaking municipal hog-raising and feeding must remember that the pigs are to be fed on garbage; *not on politics.*

The Mind of the Horse

By MAJOR OLAF SCHWARZKOPF, V. C., U. S. Army, Fort Russell, Wyo.

(Continued from page 399, August issue)

What to Abstain From

This circumstance does not prevent us from the occasional inquiry wherein we have erred, how we can yet rectify our tenets and modify our practices in order to square us with our profession and the thinking and feeling part of the public.

The direct proceeding is to find a broad-gauged interpretation of the above defined relationship to our patients. An honest reflection tells us that any and all unnecessary and preventable infliction of corporal punishment, even by severe restraint, causes bodily pain, and comes under the category of being injurious to the body; whereas any threatening attitude, particularly if accompanied by profane language, arouses apprehension in the animal of coming punishment. This causes fear, which is inimical to his mind. The degree of fear will be greater or less dependent upon a more or less sensitive nature of the animal. In this respect the horse must be regarded as a supersensitive animal.

It is sometimes difficult to strictly separate pain from fear, or to recognize which acts worse on the mind of the animal, as the two are often interwoven. But for practical purposes it is not difficult to reason out the difference in effect between proper discipline of the animal and painful restraint. Just one example: If an untrained, ignorant horse is restless or restive, i. e. fearful from being in a strange place and among strange persons, the application of a small, mild twitch simply diverts his attention from refractory fighting, does not cause pain, and is, therefore, permissible. On the other hand, the putting on his nose or ears of the ordinary twitch of the blacksmith-shop, two or three feet long, sharply twisted, causes actual pain, and must be regarded as an unethical restraint. It makes little difference whether these offenses are perpetrated by ourselves or by farriers or other caretakers under our supervision.

What We Should Try To Do

Reverse this moral proposition to make it positive: Not injurious to the body of the animal or inimical to his mind is all such conduct on our part which tends to make him understand that he is not to be hurt, that we intend to do him good, and that we desire his confidence and submission. In a majority of equine patients this is accomplished by firm and kind manners, but quite often gentle patting on the neck and face and assuring words are indicated in addition. Some men have the faculty of doing this with immediate effect, the horse trusting such men; other men will fail, even if they try, because they lack the gift of mental association with animals. The horse, being an intense observer and mindreader of man, suspects such person of a ruse and objects.

From these facts, if understood, there ought not to be a "dumb animal" to the veterinarian. Aside from the fact that they have a voice of various modulations which convey certain meanings, the manifold and characteristic movements of the body and of parts thereof, particularly the eyes and ears, indicate in sign language not only what they observe and how they interpret our actions, but also what counteraction they are likely to take. Experienced veterinarians know of all these facts, but few have observed them closely enough to reflect on their significance and to classify them for practical purposes.

The good old ethical rule to handle our patients with kindness and persuasion first, constitutes precautions which consume much less time than the preparations for restraint, which moreover leave the horse in excitement and fear of repetition, which

is highly derogatory to a good recovery. Our modern local anesthetics are effective and commendable, but they are at best temporary expedients that certainly do not replace the natural and lasting confidence of the horse secured by gentle and patient handling.

So much about the part of veterinary ethics that directly concerns us in the conduct towards our animal patients. If neglected, it tends to lower our profession; if executed with good will and skill, it dignifies it. Veterinarians, speaking in contemptible terms of the character of the horse are grievously erring, because it does reflect adversely on our standing in the eyes of educated laymen. We, more than anybody else, should know, that although the horse occupies a lower and different species than ourselves, he nevertheless is near to us in the construction and function of his body and mind.

The Sources of Animal Psychology

For general information on the subject, the reader must be referred to one of the numerous elementary school textbooks, which give a brief analysis of the mind of "civilized man," after which an advanced study can be taken up. For special veterinary study there exist a number of textbooks on physiological psychology, experimental psychology, animal or comparative psychology, morbid psychology, etc.

As a foundation and a start for those readers who may be entirely unacquainted with the subject, a diagram of the elements of the mind of man is given below, which can be used for comparison with the mind of animals.

Elements of Mind.	Feeling.....	Instinct.	
		Sensation.	
		Emotions.	
	Will.....	Attention.	
		Action.	
		Choice.	
	Knowing.....	Sense-perception.	
		Memory.	Conception.
		Phantasy.	Judgment.
		Thought.....	Reason.

Taking this diagram as a guide, we proceed by a process of comparison to check up those elements of the mind which are proved to exist in the mind of the animal under inquiry, and to strike out those which are proved not to exist or are questionable. This method of psychology is the same as that of other sciences, i. e. one of observation; and if performed under controlled conditions, if repeated and varied, it becomes an experiment.

Those readers who have not sufficient material for observation of their own, are advised to find facts by reading Darwin, Romanes, Lindsay and other older psychologists, who give an abundance of "stories" of animal intelligence. However, modern experimental psychology has brought out such an array of really scientific facts, that the earlier view of the mind of the animal as based on anecdotes, has been largely abandoned, and completely changed, and this in great measure in favor of the animal.

Synopsis of the Animal Mind

Feeling

Instinct. The term "instinct" has been so often variously defined by scientific and unscientific writers and its traditional meaning is so obscure and confusing, that it is no longer useful for exact descriptive purposes of science. The popular belief that animals act by instincts (inherited habits), while man acts by reason, is not valid. Scientists of today use this term cautiously, applying it to acts of inherited behavior; while habits are described as experiences acquired during the life of the animal. The distinction between instinct and intelligence also has undergone much change in scientific conception. While experimental psychology has shown, that numerous so-called instincts are common to man and animals, others are peculiar to the species, and need special study and further experiments to determine whether they are simple inherited behavior, habits acquired by experience or acts of intelligence. Caution is, therefore, necessary not to accept any particular definition of "instinct" as absolutely correct, and if proper information is desired, modern scientific articles are much more enlightening than the brief, dogmatic definitions of the school-books.

Sensation. Physiologically, sensation consists of the capability of the animal to see, smell, etc., by sense irritation. Psychology defines sensation as one of the elements of experience dependent upon some organ of sense. Hunger, thirst, fatigue, etc., are classed as organic sensations; while special sensations are those coming from special sense organs through which the animal gains knowledge of the outside

world. For the veterinarian, it is instructive to know, that certain disorders of sensation are not only of diagnostic value in our well known pathological terminology, but they also demonstrate mental irregularities which quite often explain an obscure behavior of the animal.

Emotions. Innumerable and fairly authentic stories prove that the horse possesses these feelings. Examples of joy and grief; of satisfaction and sorrow; of pride and other egotistic feelings, can be cited by any observing owner of horses. Even love, hate and jealousy, affections termed sympathies and antipathies, are common to the horse. The horse desires fellowship and friendship of other horses and animals and of sympathetic men as well, and he remains true through vicissitudes as I know myself. The horse hates the camel; he occasionally strongly dislikes some men, i. e. negroes. These feelings are numerous, varied and complex from inborn peculiarities, from lines of breeding, from good or bad methods of training, and are also largely the result of various kinds of labor the horse is called upon to perform in his daily toil. In fact, they make up the several types of his temperament (disposition).

Will

The almost ancient, orthodox definition of will as a conscious activity of mind coordinated to thought or reason, which negated will to animals, has been abandoned. The term will, as used in scientific psychology, signifies the sum total of all inherited and acquired tendencies that determine the actions of man and animals.

The elements of will are:

Attention. It has never been denied that the horse possesses in a high degree the power to concentrate the mind upon a particular object. In fact, it has been pointed out by comparative psychologists that the horse surpasses in this respect children and ordinary persons devoid of proper mental discipline, who are apt to change their attention quickly from one object to another. If strict attention is a criterion of a highly developed mind, as some psychologists maintain, then the horse at once occupies a front place in the mental life of our domestic animals. It is certain that only by this faculty of the horse is man enabled to train him for the many arts of riding, skilful driving, and the many tricks he learns so quickly and performs with so much pleasure to himself and to the observers. I mention here particularly the "counting horse" of the circus of twenty to thirty years ago, without which no performance was complete. It will be remembered by the older veterinarians that there was almost invariably some smart fellow in the audience who stood up and maintained that the counting was done by the "professor." The applause by the audience proved that his opinion was shared by the spectators, showing how deep-rooted the prejudice of ordinary mankind is in favor of the mental superiority of man. The fact is, that horses can count without the knowledge of numbers, as they can communicate their desires and thoughts to others of their kind and to observing men without the knowledge of a spoken language. I am aware that this opinion will appear paradoxical to the ultra phychologist; but I have made control-experiments on "counting horses" myself, and after learning how the horse counts, I could count with him but did not need to count for him. I can, therefore, better understand the experiments of Von Osten and Krall than the average reader. They are nothing more than a modern psychological experiment. These two men had the ability to select an intelligent horse, and they had the patience and love for this kind of work that carried them through innumerable difficulties. To the scientist their time was not wasted.

Action. While at first thought few men deny to the horse the power of action, here again we meet with conflicting definitions of this faculty, which obscures the solution of this question of the animal mind. If by action is meant the simple capability to carry impulses into effect, then the horse not only can but must perform action almost constantly. But orthodox psychologists can see no true action unless it is based upon the consciousness of the result to be obtained; or as some of them express it, it must have the idea of end. Such deliberate, rational action, where the impulse must be subordinated to reason, is not shown by the horse, at least it is extremely difficult to verify. However, if the test of action in this limited definition, is strictly applied to ordinary men, many will be found wanting also.

Choice. In its common interpretation,

choice is the power of preference, and as such is often enough observed in the horse. But if defined as deciding on or determining on a thing resultant from motives and reasons, the horse is devoid of this mental power.

Knowing

As regards the intellectual powers of the horse, much controversy has been indulged in by comparative psychologists. Intellect or intelligence is such a complex mental activity that it is even difficult to properly ascertain its degree in the average man. Psychological tests of intelligence are now applied in the army and at some colleges. They consist largely of sense-perception, reflection and interpretation, ascertainable by pointed questions and some instruments of precision. Possibly, if suitably altered, some of these mechanical devices may be used in testing the degree of intelligence in the horse, but so far I have seen no device that promises usefulness.

Memory. It is generally admitted that the horse has an excellent memory. The old proverb: "Man frequently forgets, a horse never does," is somewhat overdrawn, although it applies well to his everyday needs and often to his fancies. Here is one of my stories. When a young man, struggling to get a footing I purchased an old horse from an old practitioner, he predicting it would bring to me a big practice as the horse knew the locations of all his clients. I found that the horse insisted on stopping at every inn at the roadside. This was embassarring to my morals, and I stated so to the old practitioner. "Ah," he said, "Morals! That old horse has pretty strict morals himself. Just tell him: 'Hans, pass that d—— fellow, I owe him some money,' and he will go right on." I thought this was a joke, but tried it the next day on the first inn. The old horse pricked up his ears, shook his head and went by the inn in an accelerated gait. As I generally managed not to owe money to inns, I often told the untruth to the old horse, which hurt my feelings again. But we became fast friends, and I finally buried him with grief, for he had not only helped me to a start in practice, but I also learned from him my first real lesson in horse psychology.

Phantasy. That the horse is subject to phantasy is denied by certain psychologists. Yet, dreams are classed as phantasies and a horse dreams as every veterinarian will have observed. Some years ago a young university phychologist asked me if I had ever observed a horse to dream. I replied in the affirmative, mentioning that they also groan in bad dreams and that this was the cause of a professional call recently, the farrier thinking that the horse was in pain from colic. The young scientist was very skeptical about my statements, asking to put them in writing giving the date of year, month, day and the hour of the night, as also a hundred questions surrounding the exact circumstances of this momentous happening. I invited him to spend some night in a stable with me, but this invitation was generously declined, he assuring me that he believed my observation to be correct, although it was against the facts of science.

Thought. The thought-powers of the horse, i. e. the capability to discern relations between things, to reflect, to observe form, size and properties of things, are rudimentary in the horse. Some intelligent horses undoubtedly perceive certain things; they notice resemblances and discern concrete objects, but they certainly do not discern abstract qualities. Conversely, how many men can do this without much coaxing and constant correction of observation.

Judgment. The acts of some experienced horses indicate the exercise of judgment in their way of perceiving difficult situations and correcting them on their own account. A great many such stories are found in books. I have personally observed some instances of good judgment of horses, as also examples of very poor judgment. Of course, this is the same in mankind.

Reason. No doubt, occasionally some bright and experienced horse exercises reason. By experimentally putting them into situations for which we have reached the conclusion as to what they must do to solve that situation, they come to the same conclusion as shown by their action. They learn quite often the relation between cause and effect, of course, only as far as their every-day experience can go. But in these experiments we are, over again, handicapped by the various definitions of the term "reason," and as a result much

confusion still exists as regards the degree of reason manifested by the equine species.

The higher reasons, such as certainty and uncertainty of future and of belief resembling religion, do not encroach upon the mind of the horse. Neither does he possess the higher intellectual feelings such as ethical and esthetical emotions. Incredible as it may appear, this fact has been brought forward to demonstrate the limits of the horse's mind. Yet, the conception of the true, the beautiful and the good is certainly not the birthright of the human race; for that is a gift transmitted to comparatively few persons by emotional parents and even then is only slowly developed by higher learning and tedious application to the arts.

Summary

The problem of the mind of the domestic animals, in this case the mind of the horse, stands about as follows today: It has been proved by experimental, comparative psychology that the horse possesses several of the various elements of the mind of man; in some instances in the same or similar degree, in other instances in a lesser or doubtful degree. The mind of the horse is, therefore, different from the mind of man; it *is a specific mind in the scale of animal life, but related in degree to the mind of man.*

This summary may not stand the test of criticism of ultra-psychologists, but I hope that veterinarians will defend it.

If this digest of an ethical relationship towards our equine patients as based on the existence of a specific mind of the horse, can help Lieut. Conn to change his erroneous interpretations of the several examples of foolish horse sense as cited and commented upon in this Journal, to a more enlightened view, much needed good will result. For it is well known that the younger generation of veterinarians, while perhaps better prepared in manual veterinary skill and in laboratory efficiency than the older men of the profession, have come to accept a strange mechanistic view of the manifestations of life in our domestic animals. This is not only deplored by people who think and feel differently, but it must and does reflect adversely and discreditably on our profession by offending the ethical and esthetical ideas of better informed mankind.

IT WAS DIFFERENT THIRTY YEARS AGO

On page 415 of the August issue, I note a reply to A. V. C. You are all wrong for my time. I have the M. R. C. V. S. degree. I obtained it after being a student at the Clyde Street "Dick's" School, fifteen months. I entered in May, 1881, and received my degree July, 1882. I had Montreal degree of V. S., which I obtained in 1881, after a three years' attendance, which was the requirement then.

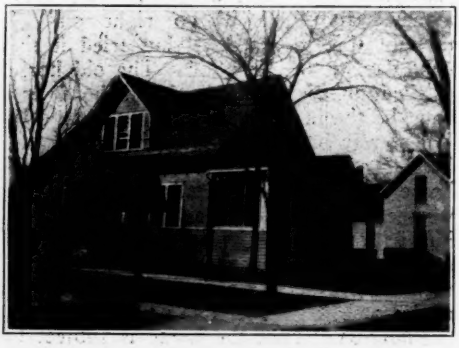
While I have no prospectus of any of the English schools now, I am confident of the practical wording of a clause which says any one holding a foreign or colonial degree (I think a school recognized by the R. C. V. S.) shall be exempt from attendance at lectures of the first and second years, but must pass all examinations and must attend one year's course of lecture before presenting himself for the final examinations.

I believe, however, that the R. C. V. S. schools have made some ruling that foreign students are not allowed as much exemption as in my time.

While a Britisher is individually good company, collectively they make many arrogant rulings, especially when their American cousins are the other party. I know. I was a fortunate student and clearly remember many acts of the students, especially those who were none too good.

Springfield, Mass. BENJAMIN D. PIERCE.

The Mississippi Valley Veterinary Medical Association held its semi-annual meeting at Galesburg, Ill., August 1st. Dr. D. M. Campbell, of Chicago, spoke on veterinary legislation and the legal responsibility of the veterinarian. Dr. J. J. Litner, of Chicago, discussed the tuberculin testing of cattle and accrediting of herds. Dr. E. F. Brown, of Blandinsville, presented a paper on the need of uniform tuberculosis laws, which was discussed by Dr. H. E. Schwarze, of Springfield, and Dr. J. I. Gibson, of Bloomington. At the conclusion of the talks, there was a round table discussion of every-day veterinary problems.



Residence of Dr. I. G. Wimsett, Winfield, Kansas.

Queries and Answers

The Veterinarians and the Hog Situation

During the past few years the veterinary profession has been confronted with a problem that is, no doubt, a serious menace to the hog raising industry. It seems as though the farmer belonged to a class that will "bite" repeatedly on more "fake dope" than any other class of people. I believe this is not wholly due to ignorance on his part, but a large part of the blame can be laid to the alluring ads in the so-called farm papers, giving a short account of the symptoms of diseases and an outline for the treatment to be given. This gives the farmer confidence that he is able to diagnose the trouble himself, and the result is he finds to his sorrow a little later that he was mistaken in his diagnosis after all.

Some of the statements made by solicitors are almost bound to put any farmer in the market for their line of "dope." Some may conclude that I am aiming at the county agent. No, we have more desperate characters than the county agent to contend with—men who are doing harm not only to the farmers but to the veterinary profession as well. I refer to the man who goes out unrestrained by law, selling "hog powder" to the farmer under all sorts of wonderful claims for his dope. There was a time when I thought that if the farmer was such a target, then let the powder agents go after him; but this practice is becoming such a nuisance that great harm results. As a rule these men are experts (?) at diagnosing diseases of swine. Of course, we as veterinarians are aware that the hog is subject to a number of diseases, but these "experts" have only one or two diseases affecting hogs; namely, worms and cholera, chiefly the former. I personally know of a number of instances where farmers were induced to purchase some of the remedies on what was supposed to be a trial offer, only to find later that the contract was in the form of a note maturing at a date which gave the agent ample time to canvass a large territory and make good his escape before his trick was discovered. This sort of agents is not very common any more. Then, we have the man that claims his powder will keep pigs immune to cholera by continued feeding of his remedy. Such statements are bound to sell any powder to a farmer as he is not familiar with the action of drugs nor how immunity is established in an animal.

There is also another form of agent who claims that there are more hogs killed by vaccination than by any other form of treatment, and as many farmers have heard more or less about the so-called "serum breaks," such statements make good selling talk for the remedies. Others claim that all pigs have worms and that they are the primary cause of all other ailments and advise ridding the pig of worms and the other complications will be looked after by the natural resisting powers of the animal. I have seen pigs affected with hemorrhagic septicemia become the victims of these "worm doctors," put on the remedy, and the disease allowed to run its course unmolested, finally becoming complicated with pulmonary or intestinal parasites until the hogs were filled with worms from one end to the other. I can recall several herds that were on "treatment" by one of the fakers, in which no intestinal parasites were present, but they became so infested by the time the farmer lost faith in the treatment that lungs and intestines were filled with them. This condition I have found most frequently in the lungs, and by the time we are called to treat such herds, they are generally beyond all possibilities of recovery. Many times when the owner finds these worms he thinks the powder man was right after all, and any explanation generally causes suspicion that we failed to diagnose the case properly. I think the best way to avoid these circumstances is to tell the owner before the autopsy is held what might be expected.

There is still another agent, the local druggist, who usually handles the remedies of one or more concerns and is sometimes seen peddling the dope. Their selling plan is to leave the powder with the understanding that if it does not do the business they will refund the money. There are very few farmers who have gall enough to ask for a refund of their money, even though they realize the powder did no good.

Last of all is the farmer who keeps his "horse doctor" books in which he finds part of a chapter on some swine disease, and after reading this over a time or two, he considers himself capable of making any sort of a diagnosis in swine and nothing seems to baffle him. He sends to Sears, Roebuck or Montgomery Ward & Co. for the necessary instruments, drugs, pills, etc., and he considers himself a full-fledged veterianarian.

The point that I want to bring out and one

I do not understand is why we as professional men must be licensed for every little thing before we are allowed to practice veterinary medicine, yet every Tom, Dick and Harry can get some hog powder, go out and sell the stuff, pretending that they can prescribe for the farmer's hogs by using their powder according to directions and get some mighty results. As swine practice is one of the big ends of our practice at the present time, it might be well for us to throw away our diplomas and various licenses and go out peddling some of the dope and enjoy the profits to be reaped from these remedies. I do not make the profit that these fellows do and cannot afford to refund the fee if my treatment is unsuccessful, and should I ask a proportionate profit, it would bring my goods above theirs. This can probably be accounted for by the cheaper grade of drugs that they use in their products. I have always held that the best was none too good, but if we will have to meet the prices of the "hog dope" man, then I am afraid we will be compelled to look for profit before results and purchase the cheaper grade of goods. I for one will not adopt this system but will see that I get results first and then a fair profit.

Williams, Iowa. W. P. BOSSENBERGER.

REPLY:—There is no remedy for the ills you mention in present legislation, nor is legislation likely to be enacted that will remedy it. A man's hogs, you must remember, are his own property and as such he may do with them as he likes so long as he does not outrage the community's sense of humane treatment for animals or endanger the life, health or property of his neighbors. Except for intoxicating liquor and narcotics, a man is at liberty to buy pretty much anything that he can pay for, be it hog feed or hog "dope." To restrict his liberty in this would give rise to endless problems, for if it were done for a beneficent end, some one would want it done for another and somebody else for still another and so on until paternalism was passed and the stage of a good (?) autocrat administering all would be reached, when you would probably be willing to head a movement for personal liberty and a return to the old days when a man could do what he pleased with his own provided he did not harm others.

But there is a remedy that has been measurably successful in some localities, and the best part of it is that it does not depend for its application upon the uncertainties of legislative enactment nor for its enforcement upon the whims or prejudices of local officials but lies in your own hands for your locality and in Doctor Smith's hands for his locality and in Doctor Brown's hands for his locality, etc.

The peddler of proprietary medicines shrewdly trades upon the desire of his customers for protection from live stock diseases. You can and should trade on the same desire and do it honestly. The advantage is all with you. You are known in the community and have the confidence of the hog owner. The peddler is a stranger and is at first regarded as a faker and looked upon with suspicion. You are qualified to render the farmer a genuine service and are there to demonstrate it year after year. The peddler knows less about hog diseases, is interested only in enriching himself and has only promises to show. An occasional farmer perhaps will "fall" for the peddler's game, but ordinarily you should win easily with a competitor so handicapped.

The chief aim of the veterinarian as well as the owner of live stock should be to prevent disease instead of having to treat it, and this is coming to be the prevailing conception of the matter. Not many of your clients may have thought this out in so many words, but all sense its meaning just the same, and their dealings with the medicine peddlers who promise to function in the prevention of disease rather than its treatment are results of this desire for protection from disease. Whose fault is it if the farmer thinks first of you when he has a sick animal and first of a proprietary remedy or the county agricultural adviser when his neighbors have sick animals, and he desires to protect his own?

The farmer prefers having his animals kept well to having them cured when sick. He will naturally turn to the veterinarian as the expert in his community in the matter of animal health and disease, and only if the veterinarian be found indifferent or wanting in performance will he go elsewhere for this service.

A veterinarian has an unequaled opportunity to observe swine culture and the practice of swine hygiene in all its phases; he has in most instances ample time to inform himself in these matters, and if notwithstanding his opportunities, he understands and shows an interest only in swine diseases, he should look to himself rather than to regulatory officers for relief from the peddler of proprietary medicines.

The state agricultural experiment stations in their correspondence are constantly advising farmers against doping their stock, and occasional bulletins are published giving an analysis of stock foods or the results of tests of so-called cholera cures. The better farm papers so far from helping the sale of proprietary remedies, are constantly warning their readers against their use. The following from the current issue of the *Breeder's Gazette* is as strong an arraignment of doping live stock as one could well make.

The Drugging of Animals

There is no sense in persistently "doping" animals with drugs; yet some men seem to get into the habit, and keep it up with detrimental effect rather than benefit to their beasts. Healthy animals need no drugs; the sick need attention and medicine from one specially trained intelligently and judiciously to give such aid. The less medicine the better, so long as the animal gets plenty of good feed and is protected against disease by every sensible means.

The chief aim of the veterinarian, as well as the owner

of live stock, should be to prevent disease instead of having to treat it, and this is coming to be the prevailing conception of the matter. We hear far too much about concoctions to be dissolved and mixed in slop for tormented pigs; and too much about all manner of alleged cholera cures which, in every instance, are worthless. We hear far too little of the true causes of disease, and the sources of pestering parasites. Yet it is all-important that we should know how diseases arise and spread, and how they may be warded off, and made innocuous. So, too, of parasites. They are not inevitable and unavoidable. They may be rooted out and kept out. Neither are animals really "heirs to disease." They may be born healthy, stay healthy and live to a good old age, without suffering from disease or requiring "dope" of any kind.

Habit explains much of the senseless employment of drugs. A shepherd got into the habit of taking purgative pills. Each time he had to increase the dose until at length he swallowed a "pitcherful," as a neighbor said, and died. In the same way hogs are kept "doped" with drugs, and take more and more until at last they die, and of course some dire disease is given the blame, when, actually, the drug had a lot to do with the demise. The determination of the cause of an ailment is of prime importance. Prevention is even more important.

Instead of employing all manner of alleged preventives in the form of drugs, with the hope of keeping hogs free from cholera, mixed infection, necrotic diseases and parasites, let us change the tune, and see how it works. Let a universal and unanimous war be started and waged to the death against dirt and every item entering into the composition of an insanitary environment for swine. Then disease and parasites, internal and external, associates and helpers of disease germs, would be decimated and eventually destroyed. Drugs cannot possibly do it. Hygiene and sanitation can win and will, if men but put as much faith in these measures as some of them appear to have in drugs, and become as persistent in putting them into effect. The rest of the fight then, properly, must be conducted by the trained veterinarian, in whose hands now are powerful and effective biological products with which diseases may be fought, in conjunction with the efforts of the hygienist, and he may find it necessary, in some instances, to prescribe drugs, but drugs alone must fail. The combination suggested can succeed, and is certain in future to be the means adopted against disease.

BULL NOSE OR SNIFFLES IN HOGS

I have under treatment a herd of pure-bred Polands in which there are six pigs affected with sniffles or bull nose. These pigs have been isolated from the rest of the herd, have received two injections recently of mixed infection vaccine and have been given the simultaneous treatment with clear serum and a virus, which produced 100% abscesses. The cases seem to continue to develop in the herd. and I should like to cure those already affected. Where the affection is not within the nasal passages, that is just under the skin on the side of the snout, I have had reasonably good success by opening, curetting and packing with tincture of iodin. This procedure does not seem applicable to the condition where it has developed within the nasal cavity. These pigs, if recovery is completely effected, will sell for an average of about $400 in next winter's market, so recovery as well as the prevention of further cases is of value.

G. A. H.

REPLY: Bull nose or sniffles, as it was formerly considered, was thought to be a form of necrobacillosis. More recently, some investigators, notably Dr. Dimock of Lexington, Kentucky, are of the opinion that bull nose is a specific, infective disease and that the causative factor is possibly the B. pyocyaneus. In the treatment of animals that are affected, it is advisable to use surgical means, thus removing necrotic tissues as far as is possible, after which there is applied some effective antiseptic such as tincture of iodin. If the affection is deep-seated, it may be necessary to use especially devised knives and canulae to loosen and remove the necrotic tissues.

It has been said by some that a vaccine or bacterin made from the B. pyocyaneus and administered every fourth or fifth day in increasing sized dosage, gives considerable relief in these cases. As far as is known the infection seems to be from contaminated surroundings, and, therefore, the disease may be partially prevented by cleaning and disinfecting the premises. On infected farms we advise the placing of recently farrowed pigs on new pastures or in new quarters.

A FORCEFUL TREATMENT FOR FISTULA OF THE WITHERS

My attention was called recently to a treatment for fistula of the withers which has been used for some time by an empiric with very good results. Having given it a limited trial, I am well pleased with the results but I hesitate to recommend it until I have had time to experiment further.

The apparatus used consists of a pressure tank; a milk fever tank will answer the purpose very well. It should be equipped with a gauge and a long rubber tube arranged so air may be forced through a dose syringe. About two ounces of equal parts of sodium bicarbonate (ordinary baking soda) and cream of tartar, are forced down the fistulous tract under about sixty or seventy pounds air pressure, which is very easily done with the apparatus described by placing the powder in the syringe and passing the nozzle down the tract and holding a piece of cotton at the external opening. Effervescence from the sodium bicarbonate will soon start things to moving, which will be appreciated by giving it a trial.

Nothing further is done except repeating the treatment once a week until a cure has been effected, which I was assured would not take more than three treatments in the worst cases. one or two being sufficient in milder cases and which I have found to be correct in my own tests.

I do not know what effect these drugs or apparently "quack" remedies would have, except the sodium bicarbonate will effervesce and cleanse or blow the tract out clean and the cream of tartar has a drying effect. I mention these because they were the drugs used. Probably some other drugs would be more effective.

If any one can explain why this treatment is effective or has had any experience with it, I should like very much to hear from him. This may be an old remedy discarded long ago, but it is new to me and has given good satisfaction to clients of an empiric, so good in fact that

he could have treated all the fistulous withers in my territory and would have had my consent, as results have been far from satisfactory to me from the radical operation or any other operation.

J. G. N.

REPLY: Results in a few cases is a poor excuse for abandoning reason in the treatment of any condition.

HEMORRHAGIC SEPTICEMIA OR DIETETIC DEFICIENCY?

I have a client whose pigs, weighing about 60 pounds, show the following symptoms. They commence by walking knuckled over on the hind legs at the fetlocks and finally go down and drag the hind parts. They seem to have considerable pain and when one goes near them, they will squeal for fear of being touched. They linger from three to six weeks and die. Their appetite is fairly good for corn, but they do not care much for slop. If there is anything you can advise me on this disease, it will be greatly appreciated.

E. W. P.

REPLY: A similar condition has been shown to be due to a nervous form of hemorrhagic septicemia; in some cases the organisms having been recovered in large numbers from the spinal fluid. Treatment for such cases would be the hemorrhagic septicemia (swine plague) bacterins. Prognosis would appear hopeless where the condition is advanced, but as a prophylactic, the bacterins should be of value. A possible even greater number of these conditons is due to a lack of one or more mineral elements in the feed. The symptoms may be said to be exactly the same as those caused by some forms of hemorrhagic septicemia, but the course usually is slower and not infrequently the condition is not fatal. The remedy for this condition is bone meal, charcoal, wood ashes, tankage, etc., and the prognosis good, even in fairly advanced cases.

LAPAROTOMY FOR PREGNANT BITCH.

I have a client who has a valuable police dog that has just been bred to some mongrel and the owner wants pregnancy prevented. What would be the best course to pursue? Directly after a bitch has been bred, what treatment is best to prevent her from becoming pregnant?

P. L.

REPLY: Two weeks after the bitch has been bred, perform a laparotomy and thoroughly massage both uterine horns betwen the thumb and finger. The fetuses at this time may be crushed easily without harming the mother. She should, of course, be under complete anesthesia.

No injection or other treatment following copulation is certain to prevent conception or should be relied upon where assurance is desirable. If, however, the prevention of fertilization is of little moment, a one per cent solution of ordinary alum or vinegar is perhaps as effective and as harmless as anything that can be used.

Although the operation mentioned in the foregoing is almost without danger if skillfully performed, it would seem that the owner might as well let the bitch go to full time and destroy the puppies. In a bitch of this size, parturition would probably not be attended with danger, and you should assure your client that there is nothing in the theory that subsequent litters might be affected by the mongrel breeding of the present litter. Telegony, which never had much to support it, is not now regarded as having any basis in fact, and furthermore, if the theory was true, it would hold the bitch as greatly affected by conception as by carrying the fetuses to normal birth.

REQUIREMENTS FOR M. R. C. V. S. FORMERLY LESS EXACTING

In the reply to A. V. C. under the heading "Nothing Unfair About It" in the August issue, page 415, I note several mistakes. E. Wallis Hoare, of Cork, Ireland, and Ben. D. Pierce, of Springfield, Mass., and several other Montreal Veterinary College graduates took advantage of the special one year attendance and graduation and degree at the R. C. V. S., 1883 to 1888, if I remember correctly. I think Edward Courtenay, of the Ontario Veterinary College, was the only one of "Andy's boys" that took advantage of it, while about ten or a dozen of American Veterinary College fellows took advantage of it. Austin Peters, of Boston, Mass., one of the Maryland Buckleys, one of the Egans, of San Francisco, Eugene Burgett, and two of the late Alex. Lockhart's nephews also took it, and a Philadephian.

Pittsburgh, Pa. JAMES A. WAUGH.

QUESTIONS

1. Will someone submit a plan for a small veterinary hospital suitable for a country practice?
2. Can someone advise me as to his success in using chloral hydrate intravenously as an anesthetic and what dosage?
3. I have occasion to operate on several cattle annually. What is the most suitable anesthetic?
4. Will someone suggest the best treatment for open joint and pneumonia, any type?

C. C. M., Sask.

The annual convention of the Washington-Oregon State Veterinary Medical Association was held at Tacoma, Wash., August 7th, 8th and 9th, with over 50 members in attendance. A "get-together" smoker was one of the interesting features of the session.

Department of Live Stock Poisoning

By L. H. PAMMEL, Ph. D., Ames, Iowa
Professor of Botany, Iowa State College

Readers are urged to take advantage of the opportunity offered by Dr. Pammel, for the identification of specimens of supposedly poisonous plants. Two good-sized specimens, carefully packed, should be sent to him direct, with such history as may be available. Simply mention that you are a reader of the AMERICAN JOURNAL OF VETERINARY MEDICINE and no charge will be made for this service.

Oak Leaf Poisoning

In a previous number of this journal I extracted a note on oak-leaf poisoning taken from the News Letter of the U. S. Dept. of Agriculture. The following are some points brought out by C. Dwight Marsh, S. B. Clawson and Hadley Marsh.*

The trouble is ascribed to two species of oak, Gambels oak (Q. Gambelii) and shinnery oak of Texas (Q. havardii). The disease the Texas oak produces is said to be "shinnery." The authors state that the injury from eating oak leaves occurs in Colorado, Utah, New Mexico and Texas. Many of the reports have come through forest supervisors, the following national forests being represented: San Isabel, Las Animas, Nebo, Fillmore, La Sal, Wasatch, Manti and Fishlake. It may be noted that the Utah national forests are largely represented and more detailed complaints have come from that state than from the others.

"While many of the reports are indefinite as to whether poisoning is more likely to occur at particular seasons of the year, there is a general agreement that most cases occur in the spring. Some say that all cases are in the spring. Most observers say that the harmful effects are produced by eating the buds and young leaves. Some say that these are most harmful after being frosted. It has been noted by many that cattle in poor condition in the spring of the year are most liable to be affected, and that if well fed they are not harmed."

The characteristic symptoms are "constipation, dark and bloody feces, and emaciation; it is said by some that an examination of the stomach contents shows masses of oak leaves, and that the material in the third stomach is dry and hard. Some of the cases are said to be acute but many linger along for weeks and months."

"Cattle No. 761 was fed entirely on oak from August 15 to September 10; lost weight, became constipated and showed mucus in the feces. It was not badly affected, but was a clear case of incipient oak-bush poisoning. This was positive evidence of the possibility of oak poisoning by mature leaves. While probably more cases of oak-bush poisoning occur in the spring, due probably to the lack of other forage, they may happen at any season when the conditions are favorable."

"Observations on the range and experimental feeding both show that some cattle may eat oak brush for a long time with no definitely bad effect. Some even eat oak exclusively with no harm. Generally speaking, those that are injured show the results only after eating a considerable quantity through a rather prolonged period. The observations on the shinnery oak showed that symptoms resulted after the animals had been feeding from 16 to 35 days."

"In the experimental animals, which were fed exclusively upon oak, constipation was noted in two cases in six days, and in the others definite symptoms appeared in from eight to thirteen days. In the two fatal cases one died in 39 days and one in 17 days. Of course, under ordinary circumstances it would not be expected that range animals would show symptoms so soon as the subject of these experiments for the feeding of the animals in the corrals was intensive, and of oak exclusively."

I might call attention here to an article I published in this journal[1] about two years ago calling attention to shinnery oak as injurious.

Dr. O. F. Foley[2] calls attention, in the same journal, to what he thought was poisoning from underbrush, possibly oak. The writer had an article in the same journal on poisoning from oaks, in which he quoted Dr. D. M. Campbell and cites the case of leaf poisoning of R. B. Hovey of Independence, Iowa, with *Quercus velutina*. Dr. L. H. Wright in the same journal[3] discusses oak-leaf poisoning in Texas. Reports from Dr. L. W. Kitchin, Dr.

*Bull. U. S. Dept. of Agrl., professional paper, 767: 1-36, f. 1-19.

[1]Am. Jour. Vet. Med., Vol. 12, 323.
[2]Am. Jour. Vet. Med., Vol. 12, 244.
[3]Am. Jour. Vet. Med., Vol. 12, 462.

L. U. Brown and perhaps others on this same subject have appeared in this journal at no distant dates. There is probably other literature that has been overlooked by Drs. Marsh. Clawson and Marsh.

Dr. Pammel falls short of doing this bulletin justice. Its authors' ignorance of Western ranges, cattle poisoning and cattle feeding is as profound as their ignorance of the literature of oak poisoning. The title of the bulletin is so misleading as to cast a serious reflection on the department that issued it. The "experiments" so elaborately detailed show: first, that cattle will make better gains on a range where there is a plentiful supply of good grass than they will make on an exclusive oak-brush range; and second, that for cattle kept in a dry lot the addition of good alfalfa hay to a ration of oak-brush improves it. The numerous reports of oak poisoning on the range are in the main reports of poisoning by poisonous plants, of which the oak is not one (probably chiefly larkspur poisoning) and hemorrhagic septicemia. D. M. C.

Supposed Poisoning From Cowbane

Dr. Gene Goss, of Blanca, Colorado, sends in a specimen to be identified, with the following letter:

"Under separate cover, I am sending you sample of a weed we have that I think is causing quite a loss among cattle in this locality. Please identify it for me and let me know if it is poisonous, and also the treatment for it. Apparently I have had some success from the use of hemorrhagic septicemia bacterins and this leads me to doubt if the weed is really the cause of our loss."

The specimen he sent is cowbane, I think, but the specimen was not such that it could be positively identified. However, I am of the opinion that it is *Cicuta maculata,* which is a very poisonous toxic plant, under certain conditions. However, the specimen sent may be *Cicuta occidentalis.*

The question has often been raised as to whether this plant is poisonous during the summer. Some years ago the writer had some experience with *Cicuta.* He fed a large number of the roots to some horses without injury, but in the fall or winter only a small amount of this would have proved fatal. It is supposed that the injurious effect from feeding this plant is from the leaves when the plants are fresh, and that the roots are not poisonous. A number of people have been poisoned during heavy perspiration, by coming into contact with the plant.

The symptoms are not given in the case of Dr. Goss, except that he thinks it might be hemorrhagic septicemia. I have discussed this poisonous *Cicuta* in my Manual of Poisonous Plants.

Ergot on Rye

Mr. M. Walter O'Donnell, of Colo, Iowa, wrote the following letter, sending with it a specimen of ergot:

"I am sending you under separate cover heads of rye. Is this ergot on the heads? If so would there be any danger in threshing a couple of loads of bundles in with a fair-sized stack of wheat straw in yard where stock can get to it? Should the straw be kept away from stock?"

Ergot, of course, is toxic, and should not be consumed by stock. It causes the disease known as ergotism. In a case like this, I presume most of the ergot will pass in with the rye and there will be little injury caused from feeding the straw. I do not happen to know how much of the ergot will pass into the straw and if any of the readers of the AMERICAN JOURNAL OF VETERINARY MEDICINE have had experience with this, I wish they would be kind enough to let me know about it.

Those nasty "jack sores" almost, if not wholly, incurable, at least the ones here shown were about as stubborn as they make them. Their stubbornness may have been due to my not using the proper drugs; this case was one of the first I was called upon to treat when I hung up my new diploma and hung out my freshly painted shingle. Should I find such sores at the present time, I should try some dichloramine-T in oil on them, and I believe I would get the desired results. The owner stated that they had been old wire marks which the jack had gnawed from time to time, finally getting the wound as shown. Is it possible that they may be caused from an improperly healed wire cut, in which the infection may have been of a low grade, that has become sealed by the cicatrix and the infective organisms incubate producing itching, causing the animal to bite the parts?
Williams, Ia. W. P. BOSSENBERGER.

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

Swine Diseases

The following six papers and discussions appended constitute a complete report of the proceedings of the section on diseases of swine at the 26th annual meeting of the Missouri Valley Veterinary Association held at Omaha July 14, 15, 16, 1919. The entire discussion of this important subject is published in a single issue at the request of the association. We feel confident that thousands of veterinarians unable to attend the Missouri Valley meeting will welcome this opportunity to get the unusually valuable information available to those who were so fortunate as to attend the meeting.

NECROBACILLOSIS

By George Byron Morse, Omaha, Nebraska.

For numerous important points omitted from this paper, those interested are referred to:

B. A. I. Bulletin, No. 63, Mohler & Washburn, Foot Rot in Sheep.

B. A. I. Bulletin, No. 67, Mohler & Morse, Necrotic Stomatitis.

B. A. I. Circular, No. 91, Mohler & Morse, Bacillus Necrophorus and Its Economic Importance.

B. A. I. Circular, No. 160, Melvin, Suppression of Lip and Leg Ulceration in Sheep; Mohler, Lip and Leg Ulceration (Necrobacillosis), Cause and Treatment.

With most humble apologies to the writers of any and all papers which I may have overlooked, I feel compelled to state that all that is known of necrobacillosis up to the present is to be found in the Bureau publications above enumerated. I would most respectfully and modestly recommend your obtaining them for study. Since these pamphlets are easily available, it would not be fair to you in the crowded condition of your program to occupy your time with that which you may there read at your leisure.

Necrobacillosis is the all-inclusive term which embraces every morbid condition caused by the necrosis-bacillus whose proper scientific name is Bacillus necrophorus.

That these various pathologic conditions have received other appellations and in many instances are more familiarly known by other names does not alter the fact that they are all forms of necrobacillosis. For instance, necrotic stomatitis is a necrobacillosis of the mouth; lip and leg ulceration in sheep is a necrobacillosis manifesting itself in the regions designated by the popular name. The various so-called metastatic abscesses found in liver, lungs, spleen, kidneys and heart are all forms of visceral necrobacillosis.

"Osis" is an ending which means condition, "Bacillosis" means a condition produced by the presence of bacilli. Prefix to that term a sufficiently recognizable part of the name of the invading bacillus and you have opened a short cut in nomenclature; for instance, "colibacillosis" is a morbid condition caused by the presence of B. coli. If pasteurellosis had not already been invented to designate any and all forms of pathologic change due to pasteurella or bacteria of the hemorrhagic septicemia group, very generally spoken of as "bipolars" we might speak of "bipolarbacillosis."

Necrobacillosis, therefore, as already defined is the accepted term for any and all morbid processes due to the presence of that particular necrosis-producing bacillus known as B. necrophorus. There are other microorganisms capable of producing necrosis but none so specifically designated as Bacillus necrophorus.

These morbid processes induced by B. necrophorus and characterizing necrobacillosis wherever found may be all summed up in "inflammation ending in necrosis accompained by a characteristic stench." Owing to the character of the inflammation, many of the forms of necrobacillosis are spoken of as inflammations with the adjective "necrotic" prefixed. Thus, necrobacillosis of the mouth is synonymous with

necrotic stomatitis; necrobacillosis of the skin is also called necrotic dermatitis. Since, however, there are various microorganisms capable of producing necrosis, the term "necrobacillosis" has this advantage that it designates the particular organism causing the necrotic inflammation.

One hears the objection, now and then, that it can hardly be possible that one bacterium can produce so many different diseases or that a single term like "necrobacillosis" can designate so many and such widely different affections. There is a very simple misunderstanding here which can be easily corrected. Bacillus necrophorus is the causative agent of necrobacillosis and the pathology of necrobacillosis is always either a caseo-necrotic inflammation or suppuration. In the structural and protective tissues, necrobacillosis is usually a true caseous necrosis; in the viscera, it takes the character of suppuration. Now, no matter how many different ailments we speak of as necrobacillosis and no matter how varied in their manifestations, the pathology is always this or that, necrosis or suppuration; and the manifold pathologic pictures presented by these two forms are almost wholly dependent upon the anatomic and physiologic peculiarities of the regions affected.

In combating an enemy, two important lines to be remembered are simply axiomatic, that is to say, they need not to be supported by defensive argument, they are self-evident. First, we must know the character of the enemy. Second, we should be intelligent as to the locality where he entrenches himself. I engage to speak mainly upon the first line.

The first proposition that I would lay down is that the Bacillus necrophorus is always a pathogen. However, while a pathogen, two phases of existence may be accorded the necrosis bacillus. It may be said to have a saprophytic existence. Yet remember, it is a pathogen. The complete cycle of this saprophytic existence involves life in the alimentary tract of hogs and herbivora and an existence in the external medium, manure and manure-contaminated soil. Yet remember it is a pathogen. It is this alternation from life in the alimentary tract to life in the external medium, and again, from life in the external medium to life in the alimentary tract, that maintains it in a living, active state in spite of the fact that it does not form spores.

Bacillus necrophorus has also a pathogenic existence or role. That is to say, from the moment it penetrates into the tissues after having passed the epidemic or epithelial barriers, its life history is altogether of a different order from that found in the alimentary tract or external medium. No longer a modest coccoid form pleading "by your leave" in the midst of barnyard soil; no longer a *bon homme*, feeding generously on deoxydized pabulum hidden away in anerobic gobs of the intestine and quietly growing from coccoids to polar-stained ovals, to rods and beaded filaments. Now, it is a pathogen with all the devastating ruthlessness that you can read into that word. Always and everywhere a pathogen, although frequently posing as a modest saprophyte.

Will you pardon an illustration from recent history? I am tempted to say that B. necrophorus like certain Prussian nobles of recent years, no matter where he is, is always and everywhere a Hun. Whether enjoying life in its own proper borders or forced to eke out an existence in the wilderness of the external medium, he is always and everywhere a promulgator of ruthlessness. Given the lightest entré into surrounding areas and instantly his true character asserts itself.

Most humbly do I confess before this loyal assemblage which represents a class that has suffered perhaps more than any other form for its loyalty during the past two years, I confess, I say, to a little writing of years ago that might have, mark you, *might have*, I say, given to the ex-kaiser his idea of gas warfare. I quote from page 86 of B. A. I. Circular, No. 91, on Bacillus necrophorus and its economic importance.

"It may be stated with positiveness that B. necrophorus does not enter an unimpaired tissue. Most, if not all, of its infections with which we are acquainted require for their inception a break in the continuity either of mucous membrane or skin. A histologic study of an affected area, elsewhere examined in greater detail, reveals a center of completely destroyed tissue marked by an entire absence of the specific bacteria in question. The boundary of this dead area is formed by great bundles of filaments of B. necrophorus, large numbers of leukocytes, and a fair sprinkling of tissue cells whose nuclei still respond to stains. The immediately adjoining border of surrounding healthy tissue is seen when carefully examined to possess numerous cells whose protoplasm has been more or less destroyed, and in among these dying cells a few scattered filaments have advanced like skirmishing parties before the main army. It is a true picture of a bacillary invasion of tissue begun by means of the noxious effects of a soluble, volatile toxin."

In other words, the ruthless necrosis bacilli, massed in compact phalanx, were advancing under cover of a death-dealing gas barrage. Gentlemen, Bacillus necrophorus beat the kaiser to it, and the chemists have not yet analyzed its gas. May not that task be up to the serum companies' research workers?

The next important characteristic to be emphasized before a gathering such as this, is that Bacillus necrophorus never gains entrance to the body tissues without previous impairment of its protective covering. Kindly note my language. It has been customary to say that B. necrophorus never attacks healthy tissue. This statement appears to be invalidated by certain experiments that suggest that under peculiarly

favorable conditions—please note—"under peculiarly favorable conditions" the necrosis bacillus *can* infect healthy tissues. A more disturbing example, because not artificial, but occurring frequently, is that of the metastatic necroses. And it is because of these visceral or metastatic necroses, I change my language, though not (kindly mark this) though not the real principle involved in B. necrophorus being pronounced a secondary invader or one requiring a previous disturbance of tissue integrity. Instead, therefore, of saying that Bacillus necrophorus never attacks healthy tissue (although in principle that is true) let me say that Bacillus necrophorus never attacks the tissues of the body without previous impairment of the body covering, either skin or mucous membrane.

What the moat with its drawbridge was to the feudal lord's castle in the days of the medieval marauders, that the body covering (skin or mucous membrane) is to the body. Cross that and there is no telling where or how the enemy may successfully attack. But to cross that, the guard must be struck down, the defenses destroyed. What the invader may do after he has crossed the front line defenses is another matter. You cannot have necrotic stomatitis, lip and leg ulceration, necrotic mallanders or any other form of necrotic dermatitis, necrotic ano-vulvitis, or necrotic enteritis associated with B. necrophorus, that is to say, you cannot have a necrobacillosis of the skin or mucous membrane without the prior intervention of mechanic, chemic or microbic insult to that defensive covering. But if, once within the body's lines, the necrosis bacilli be carried to liver, lung, spleen, kidney or heart, and conditions there obtain for their multiplication, they will immediately institute their "gas attack" or elimination of volatile toxins which by destruction of the proximate cells prepares the way for their advance.

When necrobacillosis is recognized in body covering, look for the predisposing factors which have damaged that tissue. When you find B. necrophorus in organs such as liver, lungs, spleen, kidney or heart, in association with an acute extensive inflammatory process, be inclined to regard an old visceral necrobacillosis as predisposing and seek another active bacterial agent of the acute inflammation. Visceral necrobacillosis is essentially a chronic process.

It is with some such principles as these that we must contemplate necrobacillosis as found in association with other morbid conditions. For instance, we have an interest in the relationship of hog cholera and necrobacillosis.

Maintaining itself in the intestines of the hog, Bacillus necrophorus is alert for the slightest invitatory situation that might arise in the mucous membrane and such receptive conditions may often be found in the ruptured superficial capillaries of an intensely hemorrhagic area. The so-called bipolar organism or swine plague bacterium may light upon such solicitous states of the mucous membrane and institute the necrotic processes peculiar to it. Similarly, the hog cholera bacillus, B. suipestifer, perhaps ever present in the hog's intestine, may utilize these hemorrhagic areas for foci of bacterial development and establish its own characteristic caseous infection.

For this reason, the farmer, hog-feeder or serum manufacturer frequently finds himself face to face with intestinal necrosis and the question as to which of three necrosis-producing bacteria is to be incriminated. He cannot himself decide the question; nor do I believe his veterinarian can without laboratory assistance unless the case has progressed so far that various distinctive morbid changes have manifested themselves.

Some of these distinctive characteristics become decidedly attenuated in the intestinal tract. For example, that characteristic of B. necrophorus by which "your nose knows" is apt to be much obscured when surrounded with the "seventy-six distinct stenches" normally present.

In the presence of these three claimants to the glory (?) of producing necrotic enteritis, two questions call for answer: (1) Is there such a pathologic entity as intestinal necrobacillosis? If so, (2) is intestinal necrobacillosis synonymous with necrotic enteritis? Answer (1) Yes, there *is* a morbid condition of the intestinal mucous membrane caused by the presence and activities of B. necrophorus and therefore properly designated "necrobacillosis." (2) While the term "necrotic enteritis" is a synonym for intestinal necrobacillosis, the two terms are not mutually reciprocal. Every case of intestinal necrobacillosis is a necrotic enteritis but all cases of necrotic enteritis are not intestinal necrobacilloses. Therefore, necrotic enteritis is not always a necrobacillosis. Far from it. However, Bacillus necrophorus must not be denied the power of producing a necrobacillosis of the intestinal mucous membrane nor of being able to carry its part along with B. suipestifer in the production of widespread diffuse necrotic inflammation of the gut.

One of the unfortunate phases of popularizing these terms and conditions is that the amateur lay diagnostician is apt to go off half cocked. He appears to think (rather should I say, feel, for his decision is a matter of the emotions and desires, hardly cerebration) he appears to feel that with his snap diagnosis of necrobacillosis he ends his trouble. Not at all. If he could rightly diagnose the necrotic enteritis as hog cholera he would know at once what to do. Serum. If he could correctly diagnose it as bipolarbacillosis he would at once think of swine plague bacterin. If he could with any assurance diagnose the enteritis as the work of B. suipestifer he would hasten to decide between vaccination with that organism or its double, Paratyphoid b. But when he diagnoses necrobacillo-

sis, he is not prepared with a bacterin or serum treatment and the affection being an inoculation or secondary disease while trying drug treatment for intestinal disinfection, he is right up against the all important question as to what pathology is opening the way for B. necrophorus. His therapeutic troubles (and prophylactic) have only just begun.

As a rule I do not consider that you can ascribe necrobacillosis intestinalis as feared by the veterinarian as due to the punctures of Echinorhynchus gigas or other intestinal parasites. You may on the killing floor pick up hundreds of intestines studded with parasitic nodules and deep in the caseous, necrotic material of such nodules you will almost certainly find Bacillus necrophorus. Sometimes pinkish zones attest slight surrounding hypermia or even inflammation. Gentlemen, when you find the widespread, diffuse, mucous membrane-peeling enteritis with here and there large caseo-necrotic patches you had better quit thinking about intestinal parasites and try to locate hog cholera, untreated or badly treated, or other mucous membrane pathology giving rise to heavy anerobic-like secretions in which Bacillus necrophorus can multiply. Treat and treat properly for filtrable virus and then try to meet the reproductive powers of B. necrophorus at every turn on the plant and eradicate, eliminate or invalidate it to a negligible quantity.

Just as we find in the abdominal cavity Bacillus suipestifer and B. necrophorus tossing pennies as to who's who in the production of necrotic enteritis, so we find in the thoracic cavity B. suisepticus and B. necrophorus flipping coins as to which is which in the etiology of multiple necrotic pneumonia in hogs. We are all well aware that the term "multiple necrotic pneumonia" belongs to the peculiar pneumonia produced by B. suisepticus. The words, however, merely as the description of a pathologic condition are equally true for necrobacillosis of the lungs. Just as necrobacillosis of the liver is a "multiple nodular necrosis" so pulmonary necrobacillosis might be described as a multiple nodular necrosis. For this reason we must differentiate between swine plague and pulmonary necrobacillosis.

Pulmonary necrobacillosis has sometimes been diagnosed "multiple necrotic pneumonia" and contrariwise multiple necrotic pneumonia has sometimes been diagnosed "necrobacillosis." As a rule, such mistakes should not occur. The necrotic nodules of necrobacillosis are usually discreet and surrounded by a slight hyperemic zone whereas the necrotic areas of swine plague (multiple necrotizing pneumonia, hemorrhagic septicemia) are caseous centers of bronchopneumonia. Generally, it must be remembered, pulmonary necrobacillosis, like all forms of visceral necrobacillosis, is metastatic in origin and chronic in character. By metastatic I mean an infection transported from some distant area of infection of the protective covering, either skin or mucous membrane. By chronic I mean that there is lacking that active energetic attack on the economy which makes what we are pleased to denominate as acute diseases.

Again, in pulmonary necrobacillosis, cut into a caseous nodule and "your nose knows." However, I must remind you that in traversing the intricate labyrinths of diagnosis, the old direction to "follow your nose" may lead astray. Visceral necrobacillosis is notably a chronic affection and the recognition of the "necrophorus" odor should not lead us to claim the cause of death as necrobacillosis. An acute bronchopneumonia, whether primary as in swine plague or secondary as in pulmonary pyobacillosis (B. pyogenes) after mastitis, for instance, may have caseous foci showing numerous filaments of B. necrophorus. We must understand that the necrotic nodules or abscesses of necrobacillosis may have been in the organ a long time. Under the destructive operation of B. suisepticus, B. necrophorus becomes greatly increased in activity and may then proceed to infiltrate as in skin or mucous membrane infections. Therefore, before claiming necrobacillosis as the entire pathology of the diseased lung in which the morbid anatomy is not sufficiently definite, be sure to eliminate B. suisepticus as the active factor, just as you will try to eliminate B. suipestifer as the initiating bacillary factor in necrotic enteritis before claiming its total pathology for necrobacillosis.

Mr. President and Gentlemen: In a kind of leaves-from-a-note book style of address I have tried to present some of the phases of necrobacillosis calling for differentiation. I have tried to emphasize the virulence with which B. necrophorus sets about its work as a pathogen. At the same time, I have with equal emphasis tried to recognize its character as a secondary invader. Permit me to warn you against all attempts to minimize the dangers from its presence and activities while urging unceasing vigilance in overcoming those affections which make easy its access to the tissues.

My residence, showing the large porch screened to keep out those pesky flies. Flowers can be seen around the porch. This photo was taken some time ago. The vines almost hide the porch now.
Williams, Ia. W. P. BOSSENBERGER.

HOG CHOLERA AND THE SWINE INDUSTRY

By U. G. Houck, Washington, D. C., Chief, Division of Hog Cholera Control, B. A. I.

It is well known that hog cholera is the most destructive enemy of swine and the greatest impediment to the swine industry. The number of hogs that die annually from this disease is greater than the total number of all domestic animals of all species that succumb to all other animal diseases, and it causes greater direct monetary losses than any other disease. There is no doubt but that the future success of the live stock industry will depend largely upon the completeness of our mastery over contagious diseases and the success of the swine industry will depend especially upon the continued control of hog cholera, since it is responsible for practically 90 per cent of the mortality of swine on farms.

This common disease made its first appearance in the United States 86 years ago, and while we have eradicated other equally contagious animal plagues we have allowed this one to spread to every part of the country and have made no determined attempts to eliminate it.

None of our prevalent contagious diseases has been discussed more freely or received more study and attention than hog cholera. Numerous laws have been passed and regulations issued to oppose its spread and prevent the heavy losses, and extensive laboratory and field experiments have been conducted in this country during the past thirty years, but notwithstanding all of the laws that have been passed, all of the regulations that have been issued, all of the teaching of our veterinary and agricultural colleges, and all of the serum and virus that have been administered, hog cholera continues to reappear year after year in the same localities and frequently on the same farms.

The fact that for the past 14 years we have known the cause of the disease and have had a reliable preventive treatment at our disposal for the last 11 years, and yet allow the heavy losses to continue, seems to indicate that there is something wrong somewhere. The question naturally arises why this condition should be allowed to exist. The most reasonable excuses that can be offered seem to be that we are dealing with a peculiar, highly contagious malady, that has become widespread, and, therefore, difficult to control. The increase in animal population, the growth and multiplication of public live stock markets and the development of transportation facilities all tend to facilitate the spread of disease. There is yet considerable ignorance and much indifference on the part of swine owners in regard to their attitude toward the adoption and enforcement of measures effectually to suppress the disease, and there is a deplorable lack of uniformity in the laws and regulations of the various states affecting live stock matters. Neither the national government, nor the states appropriate sufficient funds to do the effectual control work of which we are capable, and there has not been established the essential coordination of efforts between the live stock owners, the national and state agencies, and the veterinary profession to properly combat this malady. In other words, we are deterred by the immensity of the problem of eradication that confronts us and there has not been the real co-operation and extension of the control activities that there must be before any great progress can be made toward eradicating hog cholera.

There is no doubt that this disease can be eradicated and it will be eventually, when the various national and state agencies and the live stock owners, through their organizations, make up their minds to do the job and all pull together. Pulling together means co-operation, and co-operation is the keynote to success in disease eradication work—co-operation that carries with it adequate appropriations, mutual understanding, a sympathetic attitude and the elimination of prejudices and jealousies—co-operation that means that all concerned are concentrating and directing their efforts with one purpose in view. With this kind of co-operation we could eradicate hog cholera or any other contagious animal disease. We have demonstrated this in our past performances with contagious pleuro-penumonia, foot-and-mouth disease, and other contagious diseases of live stock.

Co-operation of the Veterinary Practitioner

Next in importance to the co-operation of the live stock owners, we must look to the veterinary profession for support and assistance. In point of numbers, the veterinary practitioners of the country rank next to the swine breeders; their number, together with their education and experience, makes them the most formidable front line fighting force that can be opposed against hog cholera. It is realized that through daily contact with farmers, the veterinarian is in a position to render invaluable service. His education and professional training enable him to understand the principles upon which modern warfare against disease is based. He can properly appraise the importance of sanitation and prophylaxis, the value of the modern weapons of offense and defense with which science is arming us, and he is able intelligently to interpret these things to farmers who must be made to understand, before they will relinquish old beliefs and practices and adapt themselves to the changed conditions under which we are now living. The veterinary practitioner is in the most advantageous position to learn the views and needs of the farmer, his opinions are sought and respected by his clients, and he can render valuable assistance as a leader in the community, not only in reducing losses by administering the preventive treatment against hog cholera, but

also in molding public sentiment to support necessary measures such as quarantine and disinfection to make the control work more effective. It is difficult to measure the real value and contributions to a community of a genuine, sincere and honest leader in such live stock matters.

It is gratifying to observe the general inclination on the part of the older practitioners throughout the country to adapt themselves to the new conditions in acquiring a knowledge of the principles of modern prophylaxis and sanitation, and the application of the new biological products that are now being used so successfully against disease.

The majority of the veterinarians in country practice at this time graduated from college before the discovery and development of the serum treatment against hog cholera and before vaccines, bacterins, aggressins, etc., became popular for use in general practice. Very few, if any, of the veterinary colleges gave any special instructions in sheep, swine and poultry diseases, and post mortems, when these men were in college, consequently they were placed at considerable disadvantage when the simultaneous treatment against hog cholera was introduced. They had little knowledge of the diseases of swine, besides much of the serum placed on the market before the passage of the virus serum act in 1913 proved impotent. In many instances the practitioner did not obtain the results that might be expected from the use of serum and virus, and for a time there was much skepticism in regard to the reliability of the treatment. Sometimes the disappointing results were due to impotent serum or contaminated virus, but quite as frequently they were due to the inexperience or carelessness on the part of the practitioner or his inability to make the proper differential diagnosis of swine diseases.

Generally, the veterinary practitioners of the country have been good co-operators in the hog cholera control work. They are constantly giving valuable assistance directly and indirectly to the national and state authorities, and their services during the war in helping to stimulate the production and conservation of live stock is generally known and appreciated, while the members of the profession who entered the military service and were given a chance made a record of which we may all justly feel proud.

Technic

The matter of technic in administering the hog cholera preventive treatment is receiving more careful attention than ever before. As late as 1913, when the Department of Agriculture commenced its educational and demonstrational work, the technic and methods of many practitioners were generally faulty and in many instances bad. Most veterinarians now know how this work should be done, but they are not the only ones who know. Farmers generally have learned, from observing careful operators, from the teachings received at the short courses given at the agricultural colleges, and from costly experiences with careless and indifferent veterinarians, what precautions should be taken by the operator, and they expect a higher grade of service than ever before. The time has arrived when the slovenly, dirty, careless horse doctor must give way to the clean, painstaking, competent veterinarian, in swine practice as well as in other branches of the profession. Complaints and lamentations have ascended from some veterinarians in certain localities, because some farmers and swine breeders in those localities decided to administer the treatment themselves to their own hogs rather than to risk the results with the local practitioners, whose technic they knew to be faulty. It is not difficult to interpret the hand writing on the wall. More and more farmers will treat their own hogs, unless veterinary practitioners keep their technic up to the proper standard, and in some instances they cannot be blamed for doing so.

Fees

There may be a few veterinarians who do not know how properly to administer the hog cholera preventive treatment; there are some who know how but create unfavorable impressions through being careless and indifferent; there are others who know how, but prefer to carry into effect ideas and fancies of their own that are not in accord with the best practices, and there are some who knowingly and willingly have charged exorbitant fees. Variation in the charges made by different practitioners in the same locality for administering the treatment has caused much dissatisfaction among farmers and resulted in more enmity and backbiting among veterinarians in recent years than any other matter connected with veterinary practice. In those states where uniform rates of charges have been established these troubles have disappeared, the farmers have discontinued doing their own treating, and they use the treatment more freely than they did before the uniform rates were established. In sections of other states the practitioners themselves have solved the problem by co-operating with the Bureau and state officials, in forming county veterinary organizations for the purpose of conferring with each other and with the officials on matters of mutual interest, including fees, supplies, technic, dosage, and unusual experiences in practice. These county organizations in Indiana and some other states have proved effective in raising the standard of the work performed by practitioners, in promoting public sentiment in favor of the methods employed in the hog cholera control work and they have been instrumental in bringing about mutual understandings and in creating and preserving the friendly professional relations that should

exist between veterinary practitioners. Much good has been accomplished in hog cholera work through the organization of county veterinary societies where the plan has been tried.

Funds

The matter of funds is an important feature of hog cholera work, and especially of co-operative control work. The Secretary of Agriculture in 1913 asked Congress for an appropriation of $75,000 for the purpose of co-operating with the various state agencies in conducting field experiments and demonstrations in selected restricted areas to obtain more information concerning hog cholera, and to demonstrate the reliability of serum and the practicability of controlling and possibly eradicating the disease in the selected restricted areas. In other words, an attempt was made to show farmers and others how they might reduce their losses from hog cholera. This was the first appropriation by the Congress for hog cholera work. The results obtained from the use of these funds were so satisfactory that the appropriations were continued each year since that time. By the end of 1915 the losses in the three counties where the activities had been carried on for three successive years dropped from 28.4 to 1.7 per hundred animals, while the production of swine in these areas was increased by more than 75 per cent. The results of these demonstrations, together with the protection afforded from the passage of the virus serum act of July 1, 1913, gave a pronounced impetus to the use of serum and virus, and this in turn reflected favorably in stimulating swine production throughout the country.

It has been demonstrated conclusively that the money expended in hog cholera control work brings enormous returns. The appropriations by Congress have been increased from year to year and the activities have been extended from the three original counties to cover most of the vast area comprising 34 of the principal hog raising states. The control work was conducted on a wider scale in 1917 than ever before, and the results attracted more favorable attention than ever before. According to the figures of the Bureau of Crop Estimates, the hog population of the country increased from 67,443,000 in 1916 to 71,374,000 in 1917, an increase of 3,931,000, and at the same time there was a marked reduction in the losses from disease. The losses from swine disease had been running very high for some years previous to 1917. In 1897 the loss was 144 per 1,000 hogs, and as late as 1914 it was 118 per 1,000, but in 1917 it was reduced to 42 per 1,000 from all diseases, which was the lowest mortality in 35 years. There seems to be no doubt whatever that these results were largely due to the additional efforts put forth by all concerned during the war to suppress the disease and increase hog production.

1918

The hog cholera work was pushed as a war measure in 1918. The regular appropriation, together with the allotment from the war emergency appropriation, gave us $449,600 for hog cholera control work for the fiscal year 1919. This sum made it possible to increase the field force in July, 1918, from 85, the normal number, to about 160 veterinary inspectors, to extend the activities so as to cover the entire areas of the 20 states where the work heretofore had been confined to limited areas and to carry the service to 14 states that had never before received the benefits of such assistance. There was a further increase of 4,213,000 in our swine production in 1918, and the losses were lowered from $73,000,000 in 1914, to $32,000,000 in 1918, a reduction of more than 50 per cent. in less than five years. These results seem to indicate that Congress and the state legislatures would be justified in appropriating larger sums for this work than they have yet done. There is no doubt that the high prices encouraged farmers to raise more hogs during the war. But the combined efforts and co-operation of the Department of Agriculture, the state regulatory authorities, the state agricultural colleges, and the veterinary practitioners figured prominently in stimulating the marked increase in swine production that followed the extension of the work in 1917 and 1918, because farmers felt assured that they would have greater protection against losses from hog cholera than ever before.

At the present time, most of the states are concentrating their attention on the eradication of tuberculosis and the cattle tick; therefore, they are not making as liberal appropriations for hog-cholera work as they would otherwise. A recent survey showed that the available funds for the hog cholera control work in the 34 states where the work is now being conducted will not exceed $250,000 for the present fiscal year. This is about 1/11th as much as the states have appropriated for tuberculosis eradication work, and is a small amount compared with the sums appropriated by the states for tick eradication work. A sum of $722,750 was appropriated by Congress for tick eradication in 1918; the 11 states engaged in this work also expended $269,172, and the counties $1,519,748. When the tick work was being pushed at the maximum during last July, 1918, 354 Bureau veterinarians, 353 state employes, and 1,490 county employes were engaged. The contrast between the vigorous prosecution of the tick eradication work and the meager efforts now being made to eliminate hog cholera is very apparent. The results, too, are very apparent—we are rapidly exterminating ticks, while we are only keeping down the losses from hog cholera. The best results that we may expect until the work is intensified and extended is only a fair control of the disease through the liberal use of serum and the appli-

cation of such sanitary and quarantine measures as we are able to apply under existing conditions.

One outstanding result of these war activities in the hog cholera work is the realization by all concerned that our efforts previous to the war were not adequate properly to cope with the conditions as they exist. It was the feeling that there should be no relaxation, but instead an extension of the activities that prompted the state veterinarians from a number of the principal hog raising states to call on the Secretary of Agriculture in May, while the agricultural appropriation was before Congress, for the purpose of urging him to ask for an increase in the appropriation for the present fiscal year, so that a sum of $600,000 might be available for the hog cholera field work. With this amount the Bureau would be able to maintain in the field throughout the year a force of not less than 195 veterinary inspectors, which would be 35 more than were employed on this work during the period of our war activities.

The Department appreciates the importance of continuing this work without abatement, and an increase in the appropriation was recommended, but the Congress has seen fit to limit the available funds to $446,865. With this amount the Bureau will be unable to maintain as many men in the field as during the greater part of last year, and it may become necessary to reduce the forces in some states in order that the funds may be equitably allotted among the swine growing states.

Mixed Infections

Much has been said recently on the subject of mixed infections, and some veterinarians are attempting to make differential diagnoses of hog cholera, swine plague, pneumonia, necrobacilosis, mixed infection, influenza, hemorrhagic septicemia, septicemia, reaction to vaccination, etc.

During the last year the veterinary literature has been filled with discussions of some swine disease. We find papers dealing with mixed infections in swine, and even with influenza in swine. Coincidently with these discussions there has been brought before the veterinarian a formidable array of bacterins, and recently an anti-mixed infection serum, all of which are recommended to combat these various conditions. While some express confidence in their ability to make positive and correct field diagnoses of these various conditions, it seems probable that the average veterinarian is unable by microscopical examination to make the fine distinctions which these authors describe. It is evident that the whole matter of infectious diseases in swine other than hog cholera, is extremely confused, and what is needed is to get some order out of the chaos which now exists.

We know that we have in the United States one disease, hog cholera, which has in the past caused the loss of millions of hogs, and which has at times rendered hog raising practically an impossible industry in certain infected sections. We have reached a point where losses from hog cholera can be with a fair degree of certainty controlled through the intelligent use of anti-hog-cholera serum and the application of sanitary measures, such as quarantine and disinfection. It is natural, therefore, that some attention should be given to the other infections of swine, which, while far less serious, are still of sufficient importance to justify careful study and the formulation of methods for their control or eradication. Hog cholera itself is a mixed infection in practically all cases. Of the infections other than hog cholera, it has been suggested that they might be divided in two groups:

1. Pneumonias; and
2. Intestinal disorders, which may be grouped under the general heading, necrotic enteritis.

Both of these troubles seem to result primarily from bad hygiene, filthy and insanitary yards, damp, cold and filthy sleeping quarters, impure drinking water, and impure feed and parasites. In addition to these causes may be mentioned also unusual exposure incident to shipment by rail, and especially the shipment of hogs immediately after vaccination.

From our present knowledge it is doubtful whether a disease which can properly be designated true hemorrhagic septicemia exists to any marked extent among hogs in the United States. It is probable that a large proportion of the pneumonias observed in hogs and which are for the most part sporadic in character and which do not tend to spread, certainly from one herd to another, are associated with the bipolar organism, *B. suisepticus*, and the chief justification for the statement that hemorrhagic septicemia exists widespread among hogs in the United States is the fact that this organism is present in these cases of pneumonia. At the same time the cases of disease produced by that organism in pigs are for the most part pneumonias rather than speticemia.

The cases of necrotic enteritis are of obscure origin and it is impossible to say what is the inciting cause, except that those cases are usually found among hogs where the hygenic conditions are very poor and this condition, like the pneumonias, is usually improved by moving the animals to new quarters and providing them with clean, dry sleeping places and good, easily digested food. The *B. necrophorus* is undoubltedly associated with most, if not all, of the cases of this kind, and the B. suipestifer may play a part in producing the changes observed.

With regard to treatment, it is known that most affections of swine belonging to either of the two groups above mentioned, are improved by good hygeine. Remarkable results have been claimed for various bacterins. The bacterins now on the market are of a varying composition and with our present knowledge of the con-

ditions commonly called mixed infection of swine, we are not in a favorable position to properly appraise the relative merits of the various formulae.

Therefore, the Bureau proposes in the near future to undertake a very careful study of what is called mixed infection in swine and of bacterins of various kinds, to determine from what organisms bacterins for these affections should be prepared, the dosage which should be used, the number of doses which should be given, whether they are suitable as curative agents as well as for prevention.

The whole subject of mixed infections in swine is so complicated and our present knowledge is so meager, that veterinarians should proceed with caution and should always remember that improved sanitation and feeding are always indicated whether any other form of treatment is instituted or not.

THE PRESENT STATUS OF HOG CHOLERA CONTROL

By A. EICHHORN, Pearl River, New York

At no time in the history of veterinary science in this country has the subject of diseases of swine been of more importance and greater interest than at present. One only needs to look over the programs of the meetings of the various veterinary medical associations in the country to become readily impressed that the subject of controlling infections in hogs is given a great deal of attention and furthermore that there appears to be a greater confusion in our knowledge on such infections than at any time in the past few years.

The statement of Dorset that aside from hog cholera, other infectious diseases of swine in this country are negligible has been refuted by some observers who claim that in certain localities losses from other infections surpass those sustained from hog cholera. Unfortunately up to date such statements have not sufficient conclusive scientific backing and we are still in the dark with regard to the significance of other diseases than hog cholera as being responsible for great losses among hogs.

The publications from the Bureau of Animal Industry in the past two years have shown conclusively that losses from hog cholera have been materially reduced through the use of anti-hog cholera serum and virus, these statements being backed up by conclusive statistical data. On the other hand the frequent reports of continuous losses in herds which have been vaccinated against hog cholera and also among hogs which have not been vaccinated, from infections of hemorrhagic septicemia and necrotic enteritis are indeed alarming.

The writer has attempted to obtain data to what extent these so-called mixed infections occur independently of cholera and followed up cases in which a primary diagnosis of either hemorrhagic septicemia or necrotic enteritis has been made on postmortem examination and bacteriological findings, to note whether such diagnosis was justified. In about two-thirds of these cases, however, a subsequent diagnosis of hog cholera had to be made from autopsies on animals which died in the progress of the outbreak.

There is no doubt but what we have at the present time a different condition in infections in hogs than at the time of the earlier hog cholera investigations. That is, we are confronted more frequently with complications or independent outbreaks with pathogenic organisms which were heretofore justly considered only as secondary invaders in association with virus cholera.

The question arises what has brought about this change. Various factors might be considered as being responsible for the apparent increased pathogenicity of some of the infectious agents. From our knowledge of pathogenic organisms, especially of those known to be facultative pathogenic we know that by continuous animal passage they may increase their virulence to a very marked degree. This no doubt has been the case with some of the organisms now being met with in the various swine infections which condition might have been brought about by natural sequence such as occur in the ordinary course of eptizootics, as for instance in foot and mouth disease, hemorrhagic septicemia, influenza, etc. That is at the beginning of the outbreaks the disease is less virulent in type and gradually gains in intensity until the height of the curve is reached from which a gradual diminishing of virulence is observed. By passage through animals the so-called mixed infections in disease of hogs might gain such an increased virulence and consequently they have now become by far more pathogenic than they have been in the past.

Another factor and to my mind a more important one whereby these so-called mixed infections are occurring now more frequently is due to the spread of the infection by so-called virus carriers. Virus carriers which are apparently healthy individuals are now being recognized to be the greatest menace by the sanitary police authorities and are probably responsible to a greater extent for spreading disease than any other cause. Thus in infectious disease of man we are especially confronted with this sort of spreaders. I only desire to mention typhoid fever, diphtheria, spinal meningitis and others in all of which the menace from virus carriers is greater than from the patient sick with the respective diseases.

Virus carriers in animals are also now being recognized as big factors in spreading contagions. Thus from all appearances normal animals may harbor the infection and at favorable opportunities communicate it to susceptible animals. Influenza, dourine, foot and mouth disease have

been proven to be sometimes disseminated by such virus carriers.

In mixed infections of swine we have principally three groups or organisms which are especially responsible for infections and the characteristics of all these organisms more than suggest the probability that they may be present in individuals of so-called virus carriers and at favorable opportunities become factors in the dissemination of these infections.

Bacteriological studies of the bacterial flora of the respiratory and digestive tracts of hogs have shown that the hemorrhagic septicemia organisms, the B. cholera suis and the B. paratyphosus are present in apparently healthy hogs. Furthermore those who have had the opportunity to conduct many postmortem examinations on apparently healthy hogs have very frequently noted small areas in the lungs undergoing hepatization which in many instances appear to be chronic in character. These consolidated areas on bacteriological examination frequently reveal the hemorrhagic septicemia organisms and since they occur in apparently healthy hogs they may be readily expelled through the passages and cause infections.

On the other hand the B. cholera suis and the B. paratyphosus are types of organisms which are known to remain in their pathogenic state in apparently healthy individuals. Investigations along this line have established this fact in human beings and to a lesser extent in animals. The very frequent erosions and slight ulcerations around the ileocecal valve which are met on postmortem examination in apparently normal hogs have disclosed a remarkable variety of pathogenic and non-pathogenic organisms and no doubt these organisms being evacuated with the intestinal contents may under favorable conditions produce the characteristic lesions of these infections. The name of "mixed infection of hogs" is of course inappropriate, and I simply use the term at the present time as the veterinarians have become used to designating this condition under that name.

Finally one must not lose sight of the possibility that the effort of controlling hog cholera by the extensive use of vaccination has probably resulted in increased resistance in our present hogs and that as a result of this the disease caused by the filtrable virus becomes somewhat obscured and the secondary infections which have been always recognized in connection with hog cholera appear to be predominating. As a result our attention becomes distracted from the true etiological factor and in the absence of the typical cholera lesions the veterinarian is apt to make a diagnosis of either hemorrhagic septicemia or necrotic enteritis, whereas actually the true originial factor was the filtrable virus.

The evidence may be summarized:

1. That we are not confronted at the present time with new diseases in swine.
2. That the infections aside from cholera represent pathological processes caused by organisms recognized before as being pathogenic to swine.
3. That due to some favorable conditions they have developed an increased virulence.
4. That due to the tremendous traffic in swine so-called carriers have contributed to the dissemination of these infections.
5. Finally that we must still recognize the filtrable virus as being the most important factor as preparing the field for the other pathogenic organisms.

I have abstained from mentioning the so-called necrobacillosis since the introduction of this name has never been justified as there never was sufficient scientific data presented by which the B. necrophorus could have been incriminated as being the primary responsible factor for the intestinal necrotic infections of hogs. On the other hand artificial infections with B. cholera suis and B. paratyphosus have successfully produced lesions commonly met with in intestinal infections of hogs. Thus the presence of the B. necrophorus at the best can be recorded only of secondary importance in such lesions.

It is not the intention to discuss the infections caused by germs pathogenic to hogs, but it might be advisable to emphasize the fact that the lesions produced by them are occurring now with greater frequency and that their significance should not be underestimated. The control of these infections, however, is essentially a control of hog cholera and an effective and successful control of hog cholera would result in a very pronounced diminishing of the other infections.

Hog cholera control has been exhaustively treated in bulletins and scientific articles appearing in our journals. The disease and its prevention are familiar to almost every one interested in the treatment of swine diseases; yet on account of the variations of the symptoms and lesions disclosed by the animal affected with the disease even the most experienced veterinarian is at times at a loss to make a definite diagnosis either from observation of symptoms of a single or several postmortem examinations. This is no doubt due to the fact that the disease manifests itself in many different forms. In some instances it is peracute; other times subacute and may even develop into a chronic form. The symptoms and lesions vary accordingly and become more or less obscure and due to this fact the uncertainty of a definite diagnosis by the veterinarian is so common.

In the majority of cases, however the observation of sick animals together with the postmortem examination should enable the veterinarian to make a diagnosis. All evidence of the symptoms and lesions should be carefully weighed and if possible the diagnosis should not be delayed. Temperatures should be taken of all animals which very frequently aids materially in the diagnosis. The absence of lesions of hog

cholera should not necessarily be accepted as conclusive and in such instances the condition of the remainder of the herd should be given careful consideration.

In case of any doubt whether the animals are affected with cholera or some other infection the owner should be advised that delay in waiting for definite signs might prove costly and the veterinarian should suggest the treatment of the herd for cholera.

A differential diagnosis in favor of hemorrhagic septicemia or other forms of mixed infections should not be made unless sufficient evidence is present to justify the same. That is, in case hog cholera can be excluded by the fact that the animals have been properly vaccinated with potent serum or virus; or if the symptoms of hemorrhagic septicemia or intestinal infections are found to exist in several hogs without any indication of a hog cholera infection.

It is impossible to enter into a detailed description of the differential diagnosis within the scope of this paper but this phase of the subject has been exhaustively treated in the up to date textbooks and also in special publications. However, emphasis is placed again upon the importance of not being misled by the absence of characteristic lesions of cholera and rendering a negative diagnosis.

Since the essential feature in the control of hog cholera is now recognized and accepted to consist of sanitary measures and prophylactic treatment of the animals with anti hog cholera serum and virus, it will be advisable to discuss briefly the method of procedure in preparing the products used in this treatment and the method of administering the same. It has been definitely established that anti-hog cholera serum is one of the most reliable biological products at our disposal, but at the same time we cannot deny the regrettable fact that the development of the laboratory aspect of this product has been lagging far behind and that very little progress has been made in producing this product in an improved manner to justify its wonderful effectiveness in the control of this dreaded disease.

It should be considered that in the prevention and treatment of a disease of so vast importance to the country's live stock industry as hog cholera, the product used for its control should be beyond reproach especially so since the effectiveness of the treatment is being justly recognized.

It is undeniable that all establishments engaged in the production of anti hog cholera serum are making all efforts to produce a potent product, but as it is produced today by most of the laboratories it represents only defibrinated blood from hyperimmunized hogs, a product in its very crudest stage of development as far as physical make up and its freedom from contaminating germs are concerned.

The production of a clear anti hog cholera serum without the presence of corpuscular elements of the blood was practiced in different countries of Europe and also in isolated cases attempts have been made in this country to produce such a product. The small yield obtained from such serum was the greatest disadvantage to the production of such clear serum by the different manufacturers. Dorset recognizing this fact as a disadvantage for the development of a clear anti hog cholera serum undertook investigations along this line which developed a method whereby practically all serum can be recovered from the blood of hyperimmunized animals and it is to his credit that such clear serum may be produced at a cost not much higher than the ordinary defibrinated blood.

In the method of preparation of anti hog cholera serum as is generally practiced it is impossible to prevent contaminations from outside sources. Aside from this there is the possibility that the hyperimmunized animals may contain in their blood organisms which might prove harmful to animals injected with the product.

Furthermore, so-called bloody anti hog cholera serum contains all the corpuscular elements of the blood which have no value whatever in the production of immunity, this fact having been conclusively demonstrated. It must be also recognized that when the corpuscles are injected with the serum they prevent quick absorption and act as irritants at the point of injection frequently giving rise to abscess formation. Thus such serum has not fulfilled the requirements of an ideal and effective biological product.

Serum containing corpuscular elements cannot be properly sterilized either by heat or filtration, since when heated to a point where the ordinary pathogenic germs are destroyed it coagulates; whereas its Berkefeld filtration is out of the question. On the other hand clear serum can be sterilized readily by either of the methods and by such sterilization the ordinary pathogenic germs that are dangerous to hogs are readily eliminated and by freeing it of corpuscles it is rendered more easily absorbed, thereby insuring the maximum protection within the shortest time. The fact should not be lost sight of that by eliminating the corpuscular elements from anti hog cholera serum it may be injected in proportionally smaller dosage.

In advocating a clear and sterilized serum for the control of hog cholera it is not in the least the intention to discredit the serum which has heretofore been prepared. However, from a scientific point of view and in consideration of the technical advantages which the administration of a clear serum possesses, the manufacturers should be induced to enter upon the preparation of such a serum, especially so since the cost of production is not materially increased and only requires more skillful handling and greater care in the manufacture.

Ever since the writer studied the production of anti hog cholera serum in Hungary in 1909 he has recognized the advantages of a clear serum

and has not failed to point out its superiority on every occasion. It is surprising that up to date manufacturers have not changed their crude method in preference to a more up to date and satisfactory procedure. May I not point out the fact that there is no country abroad where a serum containing corpuscular elements could be sold; all these countries requiring in their specifications a clear serum. Surely there must be a reason for this. It is the writer's firm belief that the veterinarians would readily advocate and accept such a product if it were available.

With reference to the virus there should also be an effort made to prepare the same in a more refined form and free of any possible contaminations. The advantages of such virus are also apparent. However in view of the fact that the virus animals receive is only about 1-25 the amount of serum, the danger from this source is not comparable with that arising from a contaminated serum.

As the control of hog cholera constitutes at the present time a very important part in the activity of the veterinarians and as the writer believes that the foundation of the control is vaccination with a proper serum and virus, the producers in order to assist the veterinarian in his effort should aim to supply the profession with the best that it is possible to produce.

The striking advantages of a clear and sterilized serum are:

Freedom from contaminating organisms and other foreign materials, avoiding complications and ill effects.

Refinement of the product, permitting rapid and complete absorption and giving maximum immunity in the shortest time.

Provision for cleaner and more accurate technic thereby simplifying the vaccination.

Sterility, promoting keeping qualities of the product.

It should also be recognized that a great deal depends on the proper technic in vaccination as the efforts exercised in the production of the product may become nullified by careless technic. Sanitation which also should be given due consideration does not offer any new problem and should be carried out in accordance with the sanitary requirements of the authorities for the control of this or any other highly contagious and infectious disease.

The veterinarian in his effort to control hog cholera should give due consideration to every factor including proper diagnosis and prophylaxis since only by so doing and employing the best means at his command for the control of the infection can he expect to serve his clients as he should.

Dr. Olaf Andresen, recently discharged from the veterinary corps in which he held the commission of captain, has established himself in practice at Kelso, Wash.

A PRACTICAL METHOD FOR FIELD DIAGNOSIS OF SWINE DISEASES

By J. S. Koen, Ft. Dodge, Iowa

In attempting to outline a method such as my subject indicates, I realize it imposes upon me the task of differential diagnosis.

Than the differential diagnosis of swine diseases there is no more important subject confronting the veterinary profession today. The situation has become so muddled with each investigator submitting and attempting to support his own theory that the average person is left bewildered amid the chaos of conflicting opinions. I believe most investigators are honest in their investigations, and in their conclusions, yet there is so much of disagreement and variance of opinion that some must be mistaken.

It seems natural that mere men will turn from one extreme to another. A few seasons ago we reached the extreme in declaring that hog cholera was about the only disease of swine that required or was worthy of attention. The serum treatment was heralded by some at that time as a panacea. Quite soon so-called "serum breaks" and "unsatisfactory results" followed in the wake of the attempt to use the serum treatment as a "cure all," and as a result we came to recognize diseases of swine other than cholera. Then reverting to our tendency to go to the other extreme, these other conditions received so much overemphasis that many failed to give to cholera the importance *it* deserved. The other extreme has been reached, in our judgment, in the all-too-frequent diagnosis of hemorrhagic septicemia and mixed infection in cases that do not show unmistakable evidence of cholera. This we believe has been the tendency for the past two seasons. We do not deny the prevalence, nor the increasing prevalence of these conditions. Our belief is that these are being over-emphasized and cholera under-emphasized to the detriment of the profession and the swine industry. This unbalanced consideration has caused many earnest practitioners to declare they have attended such meetings as this in the hope of getting something that would help them back home, but after listening to the papers and discussions they left more confused than ever. It shall be my effort to clarify to some extent, at least, and give to the practitioners a method that has proven practical in field work very closely related to their own. It is workable, therefore, practical. Like the Ford, it gets you there and gets you back.

It has been my good fortune to have an unusual opportunity for the investigation and treatment of swine diseases during the past six years. This experience was gained while in the employ of the Bureau of Animal Industry as inspector in charge of hog cholera control work in Iowa.

The method I shall present is based upon this experience, coupled with the observations of many of the best practitioners of that state.

Therefore, the method is one that has been proven "practical" rather than one of theory.

We shall attempt to diagnose hog cholera, swine plague or hemorrhagic septicemia, necrobacillosis, necrotic enteritis and "flu."

In attempting to arrive at a diagnosis for any case, three things are to be given most careful consideration: history, symptoms and post-mortem lesions.

History

CHOLERA. The success in securing anything like an accurate history depends largely upon the ability of the investigator to secure truthful statements from the owner or attendant. Like an unfortunate victim of tuberculosis, they won't believe the truth, they don't want to know their true condition, and will deliberately mislead you in their attempt to secure what seems to them to be a more favorable diagnosis of their case. Whatever the difficulties encountered may be, there is usually a history of exposure to infection, if the case is carefully investigated. An attempt should be made to establish a history of previous exposure or to eliminate it. The usual history is about as follows: The owner noticed a pig off feed several days, but it got all right, or one died recently, but he paid no attention to it, as a pig is apt to die any time. Then he noticed that one or two, or a few didn't come out to eat with the bunch this morning. They hung back, and when they did come out, they wouldn't eat. When pressed for more definite information there is usually some history of exchanging labor, visitation, purchase or sale of stock, with deliveries through the stock yards; some isolated case of sickness in the neighborhood a long time ago, almost forgotten, etc. *The herd is non-immune.* Hold fast to this point. It is susceptible, therefore, to be suspected of having cholera. Think cholera first and all the time until you have eliminated it entirely. Cholera is still and by far the most important disease of swine. It kills more hogs than all other diseases combined. Therefore give it first consideration.

SWINE PLAGUE OR HEMORRHAGIC SEPTICEMIA. The herd may or may not be immune. Without previous knowledge of anything wrong several hogs are found to be quite sick. Or, the herd seemed all right last night but several dead ones were found this morning. Thumpy. Cough.

NECROBACILLOSIS. No history necessary. Symptoms sufficient. Affects immune and non-immune. Loss may be quite heavy. Young pigs affected.

NECROTIC ENTERITIS. Affected individuals still eat, but what they eat does them no good. Scouring. They gradually waste away, but remain active. Slow progress of disease. Not many affected at first. Both immune and non-immune affected. Owner reports "this has been going on for quite awhile—lost one occasionally—seem to dry up and die."

"FLU." Herd sick very suddenly and severely. Pronounced thumping and coughing. Peculiar distressed cough. Apparently sore on feet. Lay on breast or sit. Attacks both immune and non-immune.

Symptoms

CHOLERA. Seldom if ever should a diagnosis of cholera be made on symptoms. Confirmation should be made by post-mortem findings. Only a few are "off" or sick. They lay in nest—when herd is stirred up or coming out, they advance slowly with heads down as though they were thinking it over. (A thinking hog is a sick hog). Appetite almost if not entirely lost. Temperature above 104° to 106° F. occasionally higher. Congestion of visible mucosa, matting or gumming eyelids. Gaunt, hollow, tucked-up flank, arched back. Respiration about normal. Constipation followed by diarrhea. Rapid weakening. Auto intoxication indicating drunkeness rather than weakness, staggering gait. Slow progress of disease at first, rapid later. Usually attacks younger hogs first, but all ages may be attacked.

SWINE PLAGUE OR HEMORRHAGIC SEPTICEMIA. Several attacked or dead in very beginning. Difficult breathing and coughing. Lies on sternum or assumes sitting position. Impaired appetite. Bowels, little disturbance noted usually. Little or no congestion of visible mucosa. Temperature rises more slowly and does not go as high as in cholera. Intermittent attacks in same herd. All ages attacked.

NECROBACILLOSIS. Visible lesions of necrotic rhinitis or stomatitis.

NECROTIC ENTERITIS. Profuse and persistent diarrhea with characteristic odor. Appetite but slightly impaired. Respiration normal. Temperature usually lower than in cholera but may reach 106° F. or higher. Visible mucosa normal or anemic. Skin scurvy. Progressive emaciation. Patient remains quite active and comparatively strong on feet. Gradually dries up. Slow progress of disease through herd.

"FLU." Sudden and severe onslaught. Patient very sick and distressed. Pronounced and peculiar dyspnea and thumping. Heavy, painful cough when stirred from nest. Muscular soreness, nervous and excitable. Congestion of eyes. Watery discharge from eyes and nostrils. Eyes do not mat and gum as in cholera. Temperatures usually high, many instances up to 108° F. Rapid loss of flesh, may lose as much as five pounds per day. Extreme physical weakness. Very rapid progress through herd. Lasts four or five days and patient begins to recover about the time death is expected. Recovery quite rapid.

Post-Mortem Lesions

CHOLERA. The practitioner and field investigator must disregard the theory that hog cholera is a lesionless disease. He must recognize all

the lesions that have ordinarily been considered as indicating cholera. The character of the lesions determines their importance. There are three lesions that are so constantly found as to justify their classification as characteristic. They are:

1. The peripheral congestion of the lymphatic glands especially the cervical and meso-colic glands.

2. The ecchymotic hemorrhages in the lung. They are distinct, circumscribed hemorrhages varying somewhat in size, but larger as a rule than the petechiæ found elsewhere. These do not rub nor wash off nor do they run together as the knife is drawn across the surface of the lung. I consider this as probably the surest and safest lesion upon which to base a diagnosis, if there be any other evidence to support it.

3. The spleen is usually involved in cholera. There may be simply congested areas, but most frequently it is more or less enlarged, soft and pulpy.

The lesions in the other organs and tissues are not so constant, therefore not so important. When found they will be recognized as distinct circumscribed petechial or punctiform hemorrhages. I have come to consider the petechiæ of the kidneys as probably of much less importance than was formerly attached to them, if not the least important of all lesions. It requires very close observation to differentiate between the petechiæ of cholera, necrobacillosis, those produced by an irritant and glomerular nephritis. Few should attempt it.

The three lesions mentioned above may not be present in the same hog, but in the large majority of cases one or more of them will be present and will be supported by other lesions in sufficient number or character to warrant a diagnosis of cholera. I would recommend that you withhold a diagnosis of cholera unless three lesions are found to support it. When coupled with any of the ante-mortem symptoms, particularly high temperature, and supported by history of exposure, three lesions even though very slight will warrant the diagnosis of cholera. Some may feel this statement so broad it will not be verified in practice. Permit me to say that during our six years of intensive field investigations for the Bureau, we found these conditions prevailing in most instances.

Swine Plague or Hemorrhagic Septicemia. The lesions predominate in the thoracic cavity. They are characterized by blotchy or diffuse hemorrhages into the serous membranes or organs. There may be similar hemorrhages into the serous and mucous membranes elsewhere. These hemorrhages wherever found are irregular in outline. The bronchial glands are enlarged and congested throughout. In the very beginning there may be only petechial hemorrhages of the heart or extreme congestion of the lungs to be followed later by all stages of hepatization, and usually associated with pleuritic adhesions. The spleen is not involved.

Necrobacillosis. The lesios of necrotic stomatitis and rhinitis are so well known as to require no description here.

Necrotic Enteritis. Until the causative factor has been definitely established, we believe this condition should be diagnosed as necrotic enteritis rather than necrobacillosis. It is characterized by diffuse necrosis of the mucous membranes lining either the large or small intestine. The membranes affected may be much thickened and either tough or granular and mealy. Frequently we find the necrosed membrane assuming the character of a false membrane lining the cecum. It is thin, dark colored, and on removal discloses a very acute inflammatory condition beneath. There is noted the characteristic odor that usually accompanies infection by B. necrophorus.

"Flu." The lesions that are usually constant in this condition are enlarged and congested cervical lymph glands. The congestion extends throughout the glands. Lobular pneumonia giving to the lungs a mottled appearance. An area of inflammation surrounds the bronchi and bronchioles. This inflammatory area involves but a small portion of the lung tissue. The bronchial glands are somewhat enlarged and congested. Other lesions are sometimes noted but are not constant.

Mortality

Cholera 85 per cent; swine plague 25 to 30 per cent; necrobacillosis heavy in very young pigs, sometimes as high as 80 to 90 per cent. Generally slight. Probably 10 to 15 per cent. Necrotic enteritis, about 25 per cent. "Flu" 1 per cent, at any rate less than 2 per cent.

I have no apologies to offer for my diagnosis of "flu."

Last fall and winter we were confronted with a new condition, if not a new disease. I believe I have as much to support this diagnosis in pigs as the physicians have to support a similar diagnosis in man. The similarity of the epidemic among people and the epizootic among pigs was so close, the reports so frequent, that an outbreak in the family would be followed immediately by an outbreak among the hogs, and vice versa, as to present a most striking coincidence if not suggesting a close relation between the two conditions. It looked like "flu," it presented the identical symptoms of "flu," it terminated like "flu," and until proved it was not "flu," I shall stand by that diagnosis.

In conclusion may I add, I know exceptions can be taken to most every statement made, but I believe these exceptions will only tend to establish or prove that the outline here submitted is a practical method for field diagnosis of swine diseases.

PRELIMINARY REPORT OF THE SPECIAL COMMITTEE ON STUDY OF SWINE INFECTIONS

By A. T. Kinsley, Kansas City

I owe all of you an apology as chairman of this all-important committee, as you will understand by the papers presented, because of the fact that my executive ability was insufficient to stimulate all members on that committee to do their part. I want you to understand that this partial report that will be given is not complete and it would be my desire to see this association change this committee, if necessary, or re-organize it, and get someone that can have the time and opportunity to work out these problems—the problem particularly, of diagnosis of swine diseases, and report at the winter meeting.

The committee, as you will note by the program, was composed of myself, Dr. Dimock, and Dr. Van Es. I have nothing from Dr. Van Es, who was assigned the topic or topics of differential diagnosis of hog cholera, necrobacillosis and tuberculosis. I have a portion of the report from Dr. Dimock, who was to assume the responsibiity of reporting on the conditions caused by the B. suipestifer, paratyphoid, colon bacillus, and a special report on infectious rhinitis of swine.

As for myself, I held on to that good old topic, swine plague. I am ready to report on that part, but will first read the report of Dr. Dimock. I will read the letter of transmissal, and that will give you a clear idea of what follows.

"Enclosed find brief notes on the bacillus suipestifer and rhinitis in swine.

"You will see from reading this manuscript that I have assumed so far as seemed safe, that the bacillus suipestifer is the cause of a disease in pigs known as infectious necrotic enteritis, and that it is the same condition that has in the past been designated as intestinal necrobacillosis.

"Regarding rhinitis I am quite convinced that this is a specific infectious disease, but I am not prepared to say that the bacillus pyocyaneus is the primary or only factor.

"From lack of time I have not taken up other conditions which were assigned to me.

W. W. Dimock,
Department Veterinary Science, University of Kentucky."

DISEASES OF SWINE

By W. W. Dimock, Lexington, Ky.

Bacillus suipestifer:—The greater part of the work that has been done with this organism took place during the time when it was supposed to be the cause of hog cholera, or in other words before the discovery that hog cholera is due to a filtrable virus. While the experimental work with this organism on rabbits and guinea pigs established fairly well its pathogenic properties for experimental animals, it can not be taken as final in the case of pigs for at that time when injected into pigs, or when fed, the possibility of virus infection can not be ignored and of course must be considered. Therefore it would seem to me that we need to carry out further experiments, carefully planned and conducted, before we can come to know the true or primary action of this organism as a possible cause of a specific disease in swine.

Before the discovery of the filtrable virus it was customary, from the standpoint of pathology and general type of disease, to rather definitely separate so-called hog cholera into the acute and chronic form. I am sure the acute type of cholera need not be explained to this body of veterinarians.

In the early days the chronic form was invariably that type of disease where more or less ulceration of the intestine took place, either in the form of "button" ulcers or of a diffuse inflammatory process ulcerative in character.

The ulcerative processes of the intestine were described as involving the whole surface of the mucous membrane giving it in general the appearance of the so-called diphtheritic membrane. The walls of the intestine would in some cases be very greatly thickened, in other cases from exudation and desquamation they would be thin, but in both cases the wall of the intestine was friable, and was easily ruptured upon handling. This form of necrosis was spoken of as being rare in acute epizootic forms of the disease, but developed in those outbreaks where the disease was more or less chronic in nature. Experimentally this same type of lesion, diffuse inflammation of the intestine, frequently occurred in animals (swine) which were fed upon pure cultures of the bacillus suipestifer. In other outbreaks the pathology of the acute and chronic types of the disease was not so clearly and distinctly separated but both types of lesions would be found in the same individual, and in many individuals in the same herd. We have since learned that we have to do with two distinct specific forms of infection in swine; one we have come to know as hog cholera due to the so-called filtrable virus and the other variously known as intestinal necrobacillosis, diphtheritic and necrotic enteritis, which I propose that we know for the time being as infectious necrotic enteritis. The term salmonellosis was proposed some years ago to be the term by which we would designate the disease caused by the bacillus suipestifer. Since this name was proposed in honor of Doctor Salmon, who not only directed but took an active part in the early work with this organism, I believe that we might well adopt this term provided that the bacillus suipestifer is found to be the specific cause of a disease of pigs.

For some time we have, as a profession, been talking about necrobacillosis in swine, there being many different forms of the disease depending upon the location of the lesion. Without going into a discussion of this condition, I

simply wish to say that it would seem to me to be impossible for any one organism to be the primary or specific cause of so many different pathological processes in so many different structures of the body.

More recently experimental work and examination of diseased tissues in cases of enteritis tend to show and to cause many to feel that the bacillus necrophorus is not the primary cause of so-called intestinal necrobacillosis. On the other hand we are swinging back to the opinion, and there is considerable evidence, both experimental and from the field, to show that of all the organisms that have been found associated with this condition, the one against which there is the most incriminating evidence is the bacillus suipestifer. This organism is frequently found in cases of enteritis in both the diseased intestine and deeper tissue, in which it produces necrosis, a low type of abscess formation and septicemia. It has pathogenic properties for experimental animals and swine. Following feeding experiments with swine necrotic enteritis can be produced. Healthy pigs placed in pens and yards that have been occupied by animals suffering with this disease, both natural and experimental, have contracted a typical form of infectious enteritis and from the tissues of these animals the bacillus suipestifer has been isolated, these pigs being immune to cholera.

I am not prepared to say positively that the bacillus suipestifer is the primary or specific cause of so-called infectious necrotic enteritis (necrobacillosis). I do feel, however, that infectious necrotic enteritis of pigs is a specific infectious disease that is due to some one particular microorganism, and that it is never due primarily to any other organisms, and that all other organisms found in the diseased intestine or in the deeper tissues of the body during the course of this disease are wholly secondary invaders. And while they undoubtedly play an important part as to the life or death of the individual the handling and control of infectious necrotic enteritis, to be successful, must be based upon preventative measures that strike at the primary cause and not a procedure either medicinal or biological aimed at the multiple number of organisms found in the tissues of animals dead from this disease (infectious enteritis).

Control the one primary and probably specific cause, together with the conditions under which animals contract the disease, and the other organisms so frequently found will be naturally cared for.

Rhinitis

Infectious rhinitis of pigs according to my observation is a specific infectious disease affecting the upper respiratory tract. It is characterized in the beginning by a sero-catarrhal inflammation of the nasal mucous membranes which soon becomes mucopurulent in nature. Later the cartilage and osseous structures of the nose and face become involved resulting in the condition clinically known as "bull nose" or leontiasis. The animals fail to grow or gain in flesh.

Cause:—While we speak of this form of rhinitis as infectious, and all the clinical and pathological evidence points in this direction, it has not been definitely determined what particular microorganism is the primary cause. The one most frequently encountered and most easily isolated is the bacillus pyocyaneus.

Occurrence:—Outbreaks of this condition occur in pigs that have been kept in the same quarters on the same farm year after year and in most cases there is a history that the breeding stock is all from the same herd. The first year that the disease is noticed usually only a small percentage of the animals become affected. The number of cases, however, increase each year until often in the third or fourth year 25 per cent of the animals may show more or less extensive evidence of the disease. Further, it has been found that where the disease existed in pigs and the year following new animals were introduced a very large percentage of them would contract the disease. This would seem to prove that the infection remains on the premises or in individuals, which become infection carriers, and is transmitted to the next generation or to young pigs recently introduced. To a certain extent this is contrary to the opinion that inbreeding is a factor; possibly however it may serve as a predisposing cause.

The clinical picture in rhinitis, commonly designated sniffles, is an acute inflammation of the nasal mucous membrane in which there is more or less nasal discharge, at first quite fluid, later the exudate becoming more or less muco or fibro-purulent in character often forming a thick membranous mass over a considerable area of the nasal mucous membranes. This is accompanied by considerable destruction of the underlying elements. The eyes will show more or less conjestion and exudation. The animal fails to gain and shortly there will be noticed a bulging of the bones of the face and head and a turning up of the nose. For example, the narrow long-nosed type of pig takes on the appearance of a Berkshire. In many of these cases there is a very marked dropping or falling of the hard palate. None of the animals so affected make any appreciable gain even when on full feed, indicating that there is considerable nutritional disturbance probably due to intoxication or the absorption of toxic products. Lesions suppurative in character may develop in the internal organs, especially the lymph glands.

In my opinion there is no connection between so-called infectious rhinitis or bull nose and the condition we know as necrotic stomatitis. In cases of chronic necrotic stomatitis the swellings and enlargements are in practically every case confined to the soft tissues and when the bones do become involved, it is due to inflammation and necrosis rather than a hyperplastic

bulging which is characteristic of rhinitis. The clinical evidence of the occurrence and infective nature of this disease seems quite conclusive, as it occurs in an increased number of animals on a farm year after year, and as new animals are introduced, they will frequently suffer from a typical form of the disease.

In a few cases we have carried out vaccination by the use of a vaccine made from the bacillus pyocyaneus and the results have been favorable in a great majority of cases; however, the work that has been done in this line is too limited to warrant making any statement regarding its value. Probably the best and most economical way to handle this disease would be by sanitary measures; vaccinate the early cases with a vaccine of the bacillus pyocyaneus, dispose of all chronic incurable cases, thoroughly clean and disinfect yards and pens, if possible furnish new quarters and introduce new breeding stock in case inbreeding has been practiced.

SWINE PLAGUE

By A. T. Kinsley, Kansas City.

Swine plague, also designated as hemorrhagic septicemia, is a specific infective disease of swine caused by the bacillus suisepticum. The presence of this disease in the United States is now apparently accepted by practically all investigators and state sanitary officials. This disease is not so fatal, neither is it so widespread, as cholera. It may occur sporadically or enzootically, but it rarely assumes an epizootic form. The losses in affected herds vary from one per cent. to seventy per cent.

Etiology:—The cause of swine plague is the bacillus suisepticum. This microorganism is a representative of the hemorrhagic septicemia group. The bacillus suisepticum is a short, bipolar-staining, polymorphic non-motile organism, and does not form spores. The organism grows readily on practically all culture media, aerobically or anaerobically. It does not liquefy gelatine or coagulate milk, and is not stained by Gram's method.

Its vitality is prolonged for from five to fifteen days in soil, feces, and water when not exposed to sunlight, but is destroyed in two or three days by desiccation, and is easily destroyed by weak antiseptics. The organism is killed in twenty minutes by a temperature of fifty-eight Centigrade.

Fowls, rabbits and guinea pigs are susceptible to the pathogenic action of these organisms. The virulence of the bacillus suisepticum is quite variable and is likely to vary with suddenness. Intrapulmonary injections into swine usually produce multiple catharrhal pneumonia succeeded by necrotic pneumonia.

Cahill has produced hemorrhagic septicemia in swine immune to hog cholera by the injection of blood from a pig dead of hemorrhagic septicemia; also by injection of pure cultures of B. suisepticum.

Source of Infection:—The bacillus suisepticum, like the other representatives of this group, is widely distributed. They are frequently found in the respiratory passages of normal swine. Their virulence is variable, and it seems plausible that some predisposing condition must exist in the swine that become affected, or the organism suddenly, for some reason unexplained, becomes sufficiently virulent to produce the disease. In most severe outbreaks it appears that the virulent organisms are transmitted from the diseased to the susceptible swine, or at least the disease may become enzootic in a very short time.

Channel of Entrance:—The channel of entrance may be by way of the respiratory organs, although the microorganism may be successfully introduced through the digestive tract or skin.

Lesions:—This disease assumes different types or forms. The following types have been recognized, namely, the septicemic type, the pulmonary type and the intestinal type. It is not uncommon to find the pulmonary and intestinal types existing at the same time. In other instances, either the pulmonary or intestinal type may represent the primary condition, and the septicemic type develop in the same animal, and usually result fatally.

The septicemic form is characterized by petechial hemorrhages in the skin in the serous and mucous membranes. There may also be some enlargement of the lymph nodes and of the spleen. The pulmonary form of the disease is characterized by an atypical catarrhal pneumonia, different areas of the lung showing different stages of progress of the disease, such as congestion, red hepatization, gray hepatization, and later necrosis, in which the necrotic material may be liquid or caseous. As a result of the variation of the progress of the disease in different areas, the affected lung has a marbled or mottled appearance. There are some interlobular infiltrations: the bronchial and mediastinal glands may contain hemorrhages or necrotic centers; the pleura is usually affected with a fibrinous pleurisy with or without adhesions. In the more chronic cases the necrotic foci in the lung become more numerous and there may be a purulent or septic pleurisy, the discharge into the pleural cavity of the contents of necrotic pulmonary centers. There will be a diffuse redness of the skin.

The intestinal form of the disease is usually manifested by hemorrhages and inflammation, the inflammatory process resulting in the deposit of a sticky tenacious exudate, which may be uniformly distributed upon the mucosa of the large or small intestine, or it may appear as scattered areas. The exudate adheres tenaci-

ously to the mucous membrane. The related lymph glands are usually tumefied and may be hemorrhagic but there is no peripheral hemorrhage. The spleen may or may not be enlarged. This form of the disease is frequently associated with disturbances caused by the B. suipestifer, colon bacillus, bacillus typhosus and bacillus enteritis, but it is probable that the B. suisepticum is the primary disturbing factor.

It is possible that a cerebral form of this disease may exist.

Swine plague is frequently associated with hog cholera, and then the various lesions characterizing that disease will be present also, all of the lesions being variously modified.

The intestinal form of this disease is evidenced by digestive derangement. There is usually diarrhea which persists and the animal rapidly emaciates and becomes weakened and dies in from a few days to perhaps two weeks after the onset. During practically the entire course of the disease the appetite remains good. This particular type of the disease in some localities is designated as the drying up disease.

Diagnosis:—The diagnosis of swine plague is attended with considerable difficulty. The septicemic form can be distinguished from the uncomplicated septicemic form of hog cholera only by the demonstration in the blood of the bacillus suisepticum and the presence of hog cholera virus by the production of hog cholera by inoculation with the filtered blood.

From the pneumonia of hog cholera the pulmonary form of swine plague is differentiated only by autopsy. The lung lesions in hog cholera consist of a typical croupous pneumonia and in the later stages, of necrosis.

Verminous pneumonia can be differentiated from swine plague by the chronicity of the attack, the wheezing respiration, and the demonstration on autopsy of the Strongylus paradoxus.

The verminous pneumonia caused by the development of the larvial form of the Ascaris suum is embolic in character and can be identified by demonstration of the larvae microscopically.

Catharrhal pneumonia is differentiated from swine plague pneumonia, by the fact that the former disease occurs only in young pigs and is sporadic, and rarely are the necrotic centers typical of swine plague found in the lung. Pleuritic complications are also the exception in catarrhal pneumonia.

Discussion:

Dr. Haelam:—I think credit should be given to American investigators outside the veterinary profession, for the light they are throwing on the occurrence of bacillus suipestifer. One of the speakers mentioned B. suipestifer as a normal inhabitant of the intestinal tract of the hog. This statement is also found in text books but the accuracy of this opinion must be seriously questioned so far as healthy hogs in the United States are concerned. Jordon has shown in a series of papers published in the Journal of Infectious Diseases that, contrary to the opinion held by some German investigators, strains isolated from the intestinal tract of healthy hogs fail to conform to the cultural and biological tests of Bacillus suipestifer. Jordon examined 291 healthy, freshly slaughtered animals from the Union Stock Yards, Chicago, and in no instance did he isolate B. suipestifer. To quote his conclusions, "The observations recorded in this paper suggest that the B. suipestifer is not a common inhabitant of the intestine of normal swine, and its occurrence in these animals is to be looked upon as an expression of the 'carrier' conditions."

The erroneous conclusions arrived at by some investigators were probably due to the lack of methods for differentiating between B. suipestifer and similar organisms, or to the examination of previously infected swine that were chronic carriers. Jordon has shown that it is possible to differentiate B. suipestifer from B. paratyphoid B. by use of different carbohydrate media, and that all typical strains of these organisms may be differentiated by the fact that the paratyphoid organisms blacken lead acetate agar and B. suipestifer fails to blacken this medium.

Tenbroeck, of the Rockefeller Institute, also fails to find B. suipestifer to be a normal inhabitant of the intestinal tract of the hog. He also points out that the cultures which blacken lead acetate agar and hence must be called paratyphoid B., are of low virulence to rabbits, and the cultures not blackening lead acetate are highly virulent. Research carried out in the Purity laboratories last winter confirmed the relation between the blackening of lead acetate agar and the virulence of the organisms. Our non-blackening strains were uniformly pathogenic in 1/1000 c.c. or less, but 1/10 or even 1 c.c. of the blackening strain failed to injure rabbits.

What is the significance of these facts? We find that we have more and more reason to believe that in B. suipestifer we are dealing with a definitely pathogenic organism. That is the greatest thing to my mind, in that it spells sanitation in regard to vaccinated pigs. I would take great care to separate sick from well hogs. I would consider every case showing symptoms of hog cholera apt to infect the rest of the herd with B. suipestifer, and advocate more stringent separating of well animals from sick animals.

Dr. C. P. Fitch:—We have had a most excellent discussion of diseases of swine. In this discussion as given, one thing has been brought out, and that is that there is a multitude of infections of swine. In this multitudinous conglomeration, one disease can be readily eliminated. Doctor Koen and I have met on this

ground before; that is, the introduction of influenza as a disease of swine. This disease does not exist among swine.

In regard to this influenza which carried away so many citizens, the virus was supposed to be the bacillus of Pfeiffer. I do not believe many investigators are ready to state the cause of this disease. According to Frenchmen, it is a filtrable virus. The investigators of this country and all others where this disease has been prevalent are not ready to accept the bacillus of Pfeiffer as the cause of this disease. The virus of influenza is not pathogenic except to man and monkeys, by artificial inoculation.

The true influenza pneumonia occasionally associated with this disease is characterized by pulmonary edema, the victims being drowned in their own fluids. It is associated with the pleuritic fluid which takes up the whole thoracic cavity. The virus is not pathogenic for animals and the pneumonia produced by the virus is not characterized by the lesions described by Dr. Koen. I believe this disease does not exist among swine.

DR. C. M. MCFARLAND:—I was making some notes on the number of diseases we are called upon to differentiate. I had ten enumerated, and Dr. Fitch kindly eliminated one, and I will make it nine. I agree with what Doctor Fitch has said. "Flu" has been eliminated as far as Doctor Fitch and myself are concerned. In our research laboratory, every so-called influenza case showed the bipolar microorganism of hemorrhagic septicemia. I believe it is merely hemorrhagic septicemia or swine plague. Doctor Fitch has taken one disease off my list, and I want to put another in its place. That disease is malignant edema.

There seems to be an area at the present time affected with a microorganism closely associated with the malignant edema group. The evidence indicates that this area is in northern Arkansas, and southern Missouri. Pigs are the animals affected. This organism is very toxic, and kills all experimental animals, in a very short time. Experimentally, we have killed inoculated pigs in ten hours.

One case was called to our attention where a herd of pigs in Arkansas were vaccinated and in twenty-four hours nineteen pigs died. A specimen was taken from these pigs and examined at the laboratory, showing that they were extensively infected from the point of inoculation, with the bacillus of malignant edema or an organism closely related. We also found this organism in the skin scrapings of animals not sick with the disease. We found that following abrasions of the skin, this microorganism gets under the tissues, develops and produces malignant edema. That makes the disease No. 10.

While I am on my feet I wish to state that I was very much interested in some of the papers presented. I was sorry that Doctor Morse did not go further with his statements. Some veterinarians question as to whether lip and leg disease, abscesses in the liver and necrotic stomatitis are caused by the B. necrophorus. We might infer that necrotic enteritis was caused by the B. necrophorus, but he offered no proof of this.

Our research work shows that the B. necrophorus does not cause necrotic enteritis in pigs. I am glad that the Bureau is giving credit to investigations made of mixed vaccines and mixed infections in swine. I would like to see the Bureau and state governments conduct experiments along the lines of diseases prevalent in swine. This is practically unexplored. The work should not be left to commercial concerns; it costs considerable money.

In the matter of necrotic enteritis, I may say that we have proved that this is caused by the B. suipestifer and the B. paratyphosus. We do not believe the B. necrophorous has anything to do with this disease as found in field conditions. It is found in young animals, but the older animals seldom become infected primarily. If there is increased virulency, however, some of the older animals may get the infection.

DR. G. B. MORSE:—One of the sorriest experiences of my life has been that thousands of times when I have attempted to do someone a good turn, he has failed to recognize it. It discourages one and makes you feel you do not like to try again. I did my best. Really, I should not have been surprised to receive a check for $100.00 from each of the serum plants represented here today. I did my best, I thought, to explain that the man who off-handedly diagnoses necrobacillosis in looking at necrotic enteritis, has made a very serious mistake, and put himself up against a tough proposition. There were three organisms found in the intestine which might be guilty of causing necrotic conditions. I tried to throw the whole thing on the hog cholera bacillus. I am rather inclined to blame myself for putting on paper a few thoughts on necrotic enteritis.

I should like to say, however, that I was pleased with the presentation of data connected with the Doctor's suggestion of malignant edema. That makes it worthy of consideration. I do not believe that data has been furnished us for the diagnosis of "flu." We have had a specimen sent in, which was diagnosed as "flu." I thought it out of place officially, to diagnose this for a department of the Bureau which had not recognized "flu." I found most of the cases were not very hard to diagnose as hemorrhagic septicemia or swine plague. The cases suggested very clearly, the presence of that organism. We are likely to get quite excited over the failure

of the medical profession to find the cause of "flu." Let us wait a little on this question.

DR. J. S. KOEN:—Doctor Morse admitted he had seen only one of the cases diagnosed as "flu." He has been able to find a bipolar organism in cases other than those I described, even in cases that later proved to be "capsulitis," so that may or may not mean anything. In our previous discussion Doctor Fitch admitted he had never seen any of these cases of so-called "flu," and his opinions must of course be weighed accordingly. I want you to understand that this diagnosis is based upon field experience. We were up against a condition there. We would have been glad to bring to our help, the laboratories, but had we waited for that confirmation, we would still be waiting. The farmers wanted to know. We had to tell them. Should we tell them it was swine plague? It was different from any swine plague I had ever seen. It was not swine plague as recognized previously. It was a new condition. The difference of opinion among the medical profession as to the cause of "flu" does not lend much of satisfaction to us, as to establishing a definite diagnosis of the condition in pigs, as they are as muddled as we. I called it "flu" because it resembled that condition among people. The mortality was so light I did not feel that any other diagnosis was justified. I do not say that this diagnosis is right. It has not been proved what it was. I don't believe the laboratories know what it was. I should like to know.

DR. G. W. BLANCHE:—I have been wonderfully enlightened this afternoon. I feel that I want to say just a word here. I sympathize with Dr. Koen's statement. I want to say that I have had considerable experience with this disease. Last winter while meeting these losses, I consulted Dr. Koen in regard to this disease, and he hesitated to call it anything new. He said it did not seem to be like hemorrhagic septicemia; he seems to have called it "flu" for want of a better name.

The disease is different from these other diseases. The animals have a discharge at the nose, thumping, having a history of slight mortality. Perhaps "flu" is not the proper name. There may be an entirely new name for it. I rather sympathize with Dr. Koen when the evidence indicates there is a new disease. I don't think a man should be censured when calling it influenza, if it looks like that.

I was interested in the remarks about malignant edema. I was called in consultation, to see a number of hogs. Eleven had died immediately following vaccination; that is, in twenty-four hours. The veterinarian had been using a well known and very reliable serum. I went with him to try and pacify the owners of the hogs. The animals died with all the symptoms of malignant edema; the lesions were the same. These hogs were shipped in from the northern part of Arkansas. The veterinarian did not blame the serum, but the owner of the hogs did. These hogs might have been infected on the skin and malignant edema being a very persistent infection, might not have been destroyed by the antiseptic used. I was very much interested in this report. I wonder if there is not something to it that may explain certain hitherto unexplained lesions following vaccination.

THE FILTRABLE VIRUS IS THE GREAT DESTROYER OF SWINE

A movement of comparatively recent origin, designed to emphasize the necessity for more accurate diagnoses of swine diseases, and to show the prevalence, as primary infections, of such diseases as hemorrhagic septicemia, necrobacillosis, mixed infections, etc., is having a very marked effect upon many practitioners and others having to do with disease conditions among hogs. While many well meaning investigators have participated in this movement, some having ulterior motives have been very active. There is no disputing the fact that in the past too little attention has been given to the diseases of the hog other than cholera, but it appears now that a reverse condition obtains.

Many veterinarians—and this number includes some confining their activities largely to the control of swine diseases—are overlooking the possibility of infection with the filtrable virus in their efforts to diagnose one of the so-called new diseases. There is a marked tendency to overlook the commonplace in the search for something possibly a little newer or more mysterious. This attitude has been responsible for incalculable losses. The administration of anti-hog-cholera serum is often delayed until too late, or until large numbers in a herd are infected, while efforts are made to treat for other conditions. If satisfactory results are to be obtained through the use of anti-hog cholera serum, treatment must be administered early in the outbreak, and until the possibility of cholera has been absolutely eliminated, or guarded against by treatment, no effort should be made to treat for other conditions.

It is not the intention here to deny that such conditions as hemorrhagic septicemia and necrobacillosis occur separate and distinct from cholera, for such have been noted as primary infections, but it is the contention that hemorrhagic septicemia or swine plague as a primary and separate disease is not found as frequently as some would have us believe, and that the line of demarcation between such conditions and cholera is not so indistinct if all the factors bearing on a correct diagnosis are given due consideration.

The history of the case in question is of vast importance. An accurate history may often be sufficient for a diagnosis, but no diagnosis should be made until all other factors are reviewed. Cholera is highly contagious and a group disease, while, broadly speaking, hemorraghic septicemia is a disease of the individual. It is not highly contagious. Therefore, it would not spread over a farm or a community as would cholera. As regards high mortality, hemorrhagic septicemia is not to be classed with cholera if the information at hand is of any value.

In addition to the history, the methods of handling and environment if thoroughly investigated may yield valuable clews. The symptoms as observed and revealed by the history should be carefully noted. And, finally, autopsies should be conducted when practical. In the latter connection it should be remembered that cholera may be practically a lesionless disease, and, also, that the finding of lesions enumerated for hemorrhagic septicemia, or even the laboratory demonstration of the bacillus suisepticum, does not eliminate the possibility of cholera.

Doubtless many of the failures of anti-hog cholera serum to check outbreaks of disease have been due not to the fact that a primary disease other than cholera was the offender, but rather that a low type of cholera was present at the time of treatment. Many animals treated as apparently well may have been infected, and the results obtained were of the kind usually met with when sick hogs are treated. The types of cholera found in the field at the present time differ greatly from the acute, rapid acting disease of a few years ago. The types found in the different sections of the country also vary widely. It is not uncommon in this particular section to find practically every animal in a herd sick before a single death has occurred. Often the first hogs sick are apparently so mildly affected that the sickness is not noted, and later the owner will claim that all the hogs were taken sick at the same time.

With such low types of cholera, unless great care is exercised, sick hogs may be treated, and disastrous results follow. The excitement incident to treatment may tend to remove indications of depression, and the temperature findings cannot always be depended upon. It is well known that hogs sick for several days may show a normal temperature.

Let us go back to fundamentals and carefully review and eliminate before making a diagnosis. If a definite diagnosis cannot be made, and such an event often comes to pass, let us consider the various angles of the proposition at hand and exercise common sense.

Adrian, Mich. B. J. KILLHAM.

Dr. W. D. Leavitt has moved from Rushville to Lyons, Ind.

A serious and fatal case, an open joint, the mandibular articulation. This wound was sustained in a rather peculiar way. The animal was standing in the barn chasing flies, and in swinging its head around struck a projecting nail with the above result. The wound was treated as for open joint, but did not yield to any treatment. The animal became more and more emaciated, probably due to absorption of toxins and was not able to eat very well. As time went on, the patient refused food altogether and rectal feeding was resorted to. The debility continued to become more and more severe until the animal was unable to rise, after which it was destroyed. Autopsy showed that the nail had caused a fracture of the temporal bone and the articular cartilage was almost destroyed by the infection.
Williams, Ia. W. P. BOSSENBERGER.

MEETING OF THE VETERINARY MEDICAL ASSOCIATION OF NEW JERSEY

The semi-annual meeting of this association was held at the Hotel Marlborough, Asbury Park, N. J., on July 10 and 11. President James T. Glennon in the chair.

The literary meeting opened with an address by Dr. William Herbert Lowe on veterinary education. He deplored the fact that the public is as yet so little acquainted with the importance of the veterinary profession in the protection and conservation of animal industry, which in turn affects so materially farming in general. He advocated the extension of this knowledge. In speaking of the potenial power that lies within the profession itself, to do things, he cited the consummation of a $10,000 scholarship in the state of New Jersey, its sole contributors being members of the veterinary profession. In starting this scholarship Dr. Lowe, who engineered it used the coat-of-arms of his state as an emblem of appeal, with the result that this fine old state has created the first veterinary scholarship in America. Speaking of men that New Jersey has given our profession and other professions and callings, his honor role included such famous men as Salmon, Edison, Cleveland, and Woodrow Wilson.

Dr. Lowe's paper was discussed by Dr. "Tom" Smith, who is quite conscious of the lack of public knowledge of the importance of the work of the veterinary profession and it occurred to him it would be well for the various associations to bring to the attention of the A. V. M. A. the advisability of a lecture bureau sending out capable speakers to call the attention of the farmer and the animal husbandman to the great service the veterinary profession can render them if they will co-operate with it. Dean Hoskins earnestly championed Dr. Smith's suggestion. Dr. De Vine also supported Dr. Lowe and Dr. Smith in their ideas, believing it a splendid suggestion and one of the important things of the hour. He believes that the public are not at all conscious or appreciative of the great work a young capable practitioner can do in his community if given an opportunity and encouragement rather than discouragement. He further believes that capable experienced speakers sent particularly in a rural community could do the stockmen great service by explaining to them the best ways to get the greatest service from their local pratitioner and the loss and disaster that is sure to follow quackery and unskilled advice.

Tuberculosis

The next speaker was Dr. John A. Kiernan, of Washington, D. C., Chief of the Tuberculosis Eradication Division. His subject was "Tuberculosis Eradication."

After first supporting and supplementing what had been said by others in respect to the ever increasing scope of veterinary service, he attacked his subject by briefly reviewing the history and extent of tuberculosis, pointing out that in its control every stock owner and veterinarian should take part in the work, as it is too colossal to be handled alone by the federal and state departments.

Speaking of its wide spread in the human family, he gave statistics to show how extensive is bovine infection in children and youths and therefore that prophylactic measures should also be directed against child infection. He quoted from a recent report of that noted authority, Dr. Theobald Smith, reciting happenings to show the necessity of supervision of pastuerizing plants if pastuerized milk is to be relied upon for human or animal food.

Prevalence

Bovine tuberculosis exists to a greater or lesser degree in every state in the union. Cattle traffic is a most potent factor in its spread and the speaker stated that in a recent shipment of cattle from a central state to Utah, when tested sixty days later over fifty per cent were found tuberculous.

A similar thing occurred not so long since in a shipment to Texas.

At present there exists less tuberculosis in the southern states than elsewhere. This should be taken advantage of and every possible precaution taken to protect these states from the introduction of diseased cattle.

The speaker also mentioned the prevalence of tuberculosis in swine. Meat inspectors' records show that ten per cent of the swine slaughtered under inspection reveals tuberculosis infection.

Spread of Tuberculosis

The tuberculous cow seems to be the greatest menace, consequently, the removal of the diseased cow and the control of her product is one of the most important primary steps. Contaminated watering troughs, water holes, contaminated feeds, including milk, and infected utensils should all be taken into account.

Detecting Tuberculosis

All three tests, i. e., subcutaneous, intradermal and ophthalmic, have their virtues and limitations. The accurate technic necessary in applying the intradermal test should not be lost sight of.

Thermic Reactions and Accuracy of Tuberculin

Statistics covering 624 reacting animals all showed lesions either macrosopical or by laboratory findings with the exception of nine.

Reaction began as early as the fourth hour in three animals, but only one gave a reaction after the twentieth hour.

The speaker described the accredited herd plan which has now proved a success. A resolution was introduced by Dr. Loblein and regularly acted upon, endorsing the accredited herd plan, a copy to be forwarded to the B. A. I.

Dr. William H. Kelly in discussing the paper believes the local veterinarian should have more recognition.

Dr. Eichhorn spoke particularly of the dosage of tuberculin. The dose to be used from now on in accordance with recent instructions issued by the B. A. I. is to be more standarized by the amount of Koch's old tuberculin it contains rather than the number of c.c. the producer may elect to recommend. This would seem a valuable departure from the methods of the past as it is in a sense a nearing of standardization of tuberculin.

Others who discussed this subject briefly were Drs. Middletown, Loblein, Mosedale, Hopper, Ellis and DeVine.

The next speaker was Dean W. H. Hoskins, his topic being, "Some Men of the Veterinary Profession of America That I have Known."

Realizing the great obligation he is under by men who have gone before him he eulogized briefly those whom it had been his good fortune to know in life sufficiently intimate to tell some of the things they left as a heritage to mankind and made the world better for having lived.

Isiah Michner, who gave two sons and a grandson to the profession. This man was a great student and the description of some of the diseases which he wrote about are still models of such diseases, notwithstanding the limited facilities of his time.

Raynor was another pioneer and one of those who was present at the first A. V. M. A. meeting held in 1862 at Philadelphia.

Alexander Liautard. This great man gave sixty years of his life to the veterinary profession of New York State and was a man of very unusual mentality and ability.

James L. Robertson, one of the finest characters that man has ever known. Briden of Boston was one of the keenest diagnosticians of lameness that America has ever produced.

Andrew Smith, a man of rugged austere nature with a tender heart. He believed during his early years that agriculture was too sorely in need of veterinary service to exact several long collegiate years for preparation **and that** practical instruction and short college terms were the things best suited for conditions.

Andrew McEachran, one of the earlier advocates of higher veterinary education. Salmon, a man who put every man, woman and child of this nation under a debt to him. The great organizer of the B. A. I., who gave twenty-one years of his life to his country's service.

Huidekoper, who left the field of human medicine to take up veterinary medicine. A modest unselfish man, and but a few have realized his work and worth, a man who not only gave his time but probably spent $10,000 of his private fortune to gain military recognition for his profession.

Leonard Pearson, one of the greatest animal engineers the world has ever known. A far greater man in his chosen work than any other man of his day and generation. His unselfish efforts were the cause of his passing away years before his time.

W. J. Coates, a student all his life. One of the finest characters and greatest teachers that any profession ever knew.

H. D. Gill, another of those self-sacrificing men that had but one thought in serving his profession and country as exemplified in his last work, giving all, even his life.

McKillip, a teacher and one of the greatest surgeons that America has ever produced.

After having lived to know three generations, the memories of the men who have gone caused the speaker to express that we should dedicate our lives to the memories of these great men by the removal of the perils of animal industry, all of which he sees possible in the great city of New York, which gave birth to the veterinary profession of America, to veterinary journalism and to the A. V. M. A.

The first speaker of the second day was Capt. Harry Ticehurst, the title of his paper being, "The Difference."

In explaining the difference between the Remount Service and the Camp Service he entered quite in detail on the duties of the veterinarian, the military exercises, the methods of handling stock, etc.

Hog Cholera

Capt. Ticehurst was followed by Dr. Eichorn on the "Present Status of Hog Cholera Control."

He pointed out that the subject of controlling infections in swine is at present very confusing and is receiving as much if not more attention than ever before. It is true that there seems to be greater complications or secondary invaders, probably due to the increasing virulence of the facultative organisms. He spoke particularly of virus carriers and their menace in some human diseases and that their danger in animals is now being recognized.

Diagnosis

In many instances it is difficult or impossible to make a positive diagnosis and he very clearly emphasized the great variation of symptoms and lesions, in simple true cholera.

As a guide for diagnosis he mentioned the necessity of considering all physical evidence, including temperature and where cholera is even suspected, treatment should not be delayed. He cautioned against being misled by the absence of evidence of cholera since cholera may exist in some cases where all definite symptoms are wanting.

He also spoke of the gradual improvement in the production of serum and explained the advantages of clear sterile serum, being free from corpuscular elements. Some of its advantages are smaller dosage and more prompt absorption. He also pleaded for greater effort in avoiding contaminated virus and the careful aspetic handling of these biologic products when being used by the practitioner.

Much interest was shown in this subject and was discussed by Drs. Height, Peterson, Higgins, Hopper, Harley, Ticehurst and J. Payne Lowe.

The next speaker was Dr. J. F. DeVine, his subject being, "Early Diagnosis of Pregnancy in our Larger Animals."

In large dairies the question of whether animals are pregnant or not is often of much importance, particularly where testing for official records are being carried on. He pointed out the things to be taken into account as a guide of early pregnancy and cautioned against errors in diagnosis, when it is attempted earlier than the fifth or sixth week, and the difficulty encountered in some cases in determining pregnancy between the fifth and eight months.

The society adjourned for luncheon and Lieut. Louis Griessman of New York was the first speaker after lunch, his subject being "A Veterinarian's Experience in the A. E. F."

He gave a resume of his personal experiences on his trip "Over There," the experiences beginning early since on his way over a convoy was attacked by a U-boat, the conflict lasting about two hours. His work in France convinced him that the X-ray would have been a valuable apparatus. He predicts another war and intends to pay much attention to the perfecting of the

X-ray, of which he is an earnest advocate and pioneer. Lieut. M. A. Pierce who had been out of service but one day was called upon by the chair and gave some splendid information relative to the treatment of infectious lymphangitis.

Other Observations

The trouble maker, McDonough did not show up.

Many of the "smilers" were on the job, among them "Tom" Smith, Ex-President J. Payne Lowe and the two Bobs (Ellis and McKellar). Dickson of Fairhaven was on the reception committee.

Glennon's number was 32.

J. F. DeVine.

Army Veterinary Service

From the Office of the Surgeon General

Lieut. Colonel L. A. Merillat, U. S. A.

Lieut. Colonel Merillat was commissioned direct from civil life as a major, National Army, October 5, 1917, and assigned to duty as division veterinarian, 41st Division, with station at Camp Greene, N. C. He reported for active service October 16, 1917, at that camp. Transferred from Camp Greene to Camp Mills, N. Y., on October 24th and was stationed there until December 11, 1917. Left United States on that date, arriving in France December 29, 1917. Proceeded to Camp La Courtine, France, where he was stationed until January 6, 1918.

Acted as chief veterinarian, advance veterinary hospital, Neufchateau (Vosges) from January 10th to April 28th. This was the first A. E. F. veterinary hospital and was organized, equipped and enlarged from the capacity of 700 to 1,200 animals. The first sulphuration plant of the A. E. F. was built and operated at this hospital. A research laboratory was installed and operated with this hospital by Lieut. Strausse, M. C., and Lieut. Wight, V. C.

On April 24th, Col. Merillat was relieved from duty at this hospital and appointed executive officer for the Franco-American Veterinary Liaison Mission, Paris, in which capacity he served until August 1, 1918. The mission submitted circulars to the American army on the management of animals and the handling of the principal animal scourges, inspected remounts, veterinary hospitals and organizations of the line and made recommendations on the sanitary problems involved in the requisitioning of approximately 75,000 horses from French civilians.

He was appointed chief veterinarian, First Army, A. E. F., on August 1, 1918, and served in this capacity until February 23, 1919. With the First Army, he served through the last phases of the Aisne-Marne operation and through the battles of St. Mihiel and Meuse-Argonne. The average number of animals in the First Army during the St. Mihiel and Meuse-Argonne operations was about 93,000 head. The veterinary corps of the First Army during these operations evacuated under the direction of Col. Merillat approximately 23,000 disabled animals. Assisted the veterinary service of the Third Army in the march to the Rhine, going as far as the city of Luxembourg, where the work was taken over by Lieut. Colonel Bemis, who was appointed chief veterinarian, Third Army. Moved from the battlefields to the training areas with headquarters at Bar-Sur-Aub, Dec. 5, 1918.

From February 23 to June 1, 1919, he attended the Ecole Veterinaire Nationale d'Alfort for the purpose of writing a report on the education of military veterinarians in France. June 1st to July 11, 1919, en route to the United States, arriving in New York on the latter date. July 12 to 23rd on leave of absence from Camp Dix, N. J.

Col. Merillat reported for temporary duty to the office of the Surgeon General, veterinary division, on July 23, 1919, and received his honorable discharge at Washington on the 25th.

The veterinary profession is justly proud of the services that Col. Merillat has performed in the veterinary corps during the war. Starting with an assignment as division veterinarian, Col. Merillat was exceedingly fortunate to have seen active service with combat troops and also with the service of supply when he was in charge of the veterinary hospital. It is only fitting that Col. Merillat's active army service should be crowned with one of the highest decorations that the French government bestows upon foreign officers. While on duty in Wash-

ington, he was notified that he had been decorated with the Legion of Honor by the French government.

Officers, Veterinary Corps, United States Army

	On duty	
	July 11, 1919.	August 11, 1919.
Colonels	0	0
Lieut. Colonels	6	5
Majors	68	54
Captains	182	119
1st. Lieutenants	382	255
2nd Lieutenants	357	178
Totals	995	611

THE VETERINARY CORPS

The army pictorial section of The Come-Back, published in the interests of the soldier patients of Walter Reed Hospital, Washington, D. C., in a recent issue contains an elaborately illustrated article on the veterinary corps of the army. Portions of the article of particular interest to veterinarians, both in and out of the army, are as follows:

The veterinary corps is one of the newest organizations to be formed as the result of this war, and the profession can be justly proud of its achievements in the medical department. It has taken the greatest war in history to demonstrate to the United States Army the needs of a properly organized veterinary corps.

As now organized, this corps is absolutely essential to the health of our men as well as to our animals. Prior to the outbreak of hostilities with Germany, it consisted of approximately seventy-five officers. On November 11, 1918, there were over 2,100 veterinary officers on active duty in the army. In addition about 200 officers and 600 enlisted graduate veterinarians eligible to become officers were in training at the veterinary training school, medical officers' training camp, Greenleaf, Ga. There was an enlisted force of over 20,000 men who had been trained and were on active duty. Not a bad record!

To realize the expansion of this corps, brought about by the needs of the service during the war, it is necessary to briefly summarize the duties of the present organization:

(a) Veterinary Sanitation. This directly concerns the health and efficiency of the animals of the command and is of primary consideration. The purpose of the veterinary corps is to pay special attention to this important feature through the highest development of this branch of veterinary science. Such duty involves veterinary sanitary inspection of stables, corrals, picket lines, forage and bedding, methods of feeding, watering, grooming, shoeing and the making of appropriate recommendations for the correction of defects which tend to impair the health and efficiency of the animals; the detection and segregation of communicable diseases, and the establishment of proper quarantine measures.

(b) The veterinary care of all sick animals of the command, which includes their professional care; the operation of veterinary hospitals, the preparation of records and the administration of the veterinary detachments.

(c) The evacuation of all disabled animals, in order that they may not encumber troops.

(d) Meat and Dairy Inspection. This service is concerned with the wholesomeness of the supply of these products and the health of the men. It includes inspection for soundness of meats received by the supply service at the time of receipt, while in storage and at issue; inspection of supply store houses, refrigerators, and methods of operation in handling the foods therein; inspection of abattoirs, slaughter houses, butcher shops, branch store houses and packing houses which may handle meats which may be sold direct through the supply officer or indirectly through local dealers; ante-mortem and post-mortem inspection for soundness and suitability for human food of animals slaughtered; inspection of dairies and milk cows that supply fresh milk to troops.

Inspect Meat for Army

At the time the armistice was signed, there were approximately 470,000 animals in our entire army. The packing house products branch of the office of director of purchase and storage, which is charged with furnishing the army with meats and meat products, were purchasing on an average of fifteen to nineteen million pounds of meat products weekly. These products consisted of beef, bacon, hams, canned meats, oleomargine, butter, cheese, lards, lard substitutes and other products. Every pound of meat shipped to France for our troops was inspected by veterinary officers. Knowing the duties of the veterinary corps, these figures can give some idea of the importance of this service at the present time, when one is almost led to believe that this war was one of science and modern mechanics alone.

To provide veterinary treatment for our army of animals, there were organized for service in cantonments in the United States thirty-five veterinary hospitals, with a capacity of from 250 to 600 sick animals. For our forces in France there were organized, equipped, trained and sent overseas thirty-five veterinary evacuation units, twenty-one veterinary hospitals with a capacity for 1,000 sick animals each, two base veterinary hospitals with a capacity of 500 sick animals each, and nine corps and army veterinary evacuation hospitals.

Three training schools were organized; one as a part of the medical officers' training camp, Fort Riley, Kansas, where enlisted men were trained; one with the medical officers' training camp, Camp Greenleaf, Georgia, where both officers and enlisted men were trained; and a veterinary training school at Camp Lee, Virginia, where overseas hospital organizations and replacement units were organized, equipped and trained. Special mention should be made of the veterinary training school at Camp Lee. It represents the first fully-equipped school of its kind ever

organized in this country and has demonstrated to the entire army that the excellent work accomplished there fully repaid the war department for the labor, time and money expended.

The present organization has thoroughly demonstrated its usefulness in the handling of animal casualties and the meat inspection service. Its evacuation service, by which all disabled animals are removed from the fighting units and placed in well-equipped veterinary hospitals, has been the means of salvaging a large number of animals which otherwise would have proven an entire loss to the army.

The best results are possible only through a completely organized and trained enlisted personnel. For the first time in its history this corps has had an enlisted force for such work, and in the reorganization of this small, but important corps, an adequate enlisted force is to be provided.

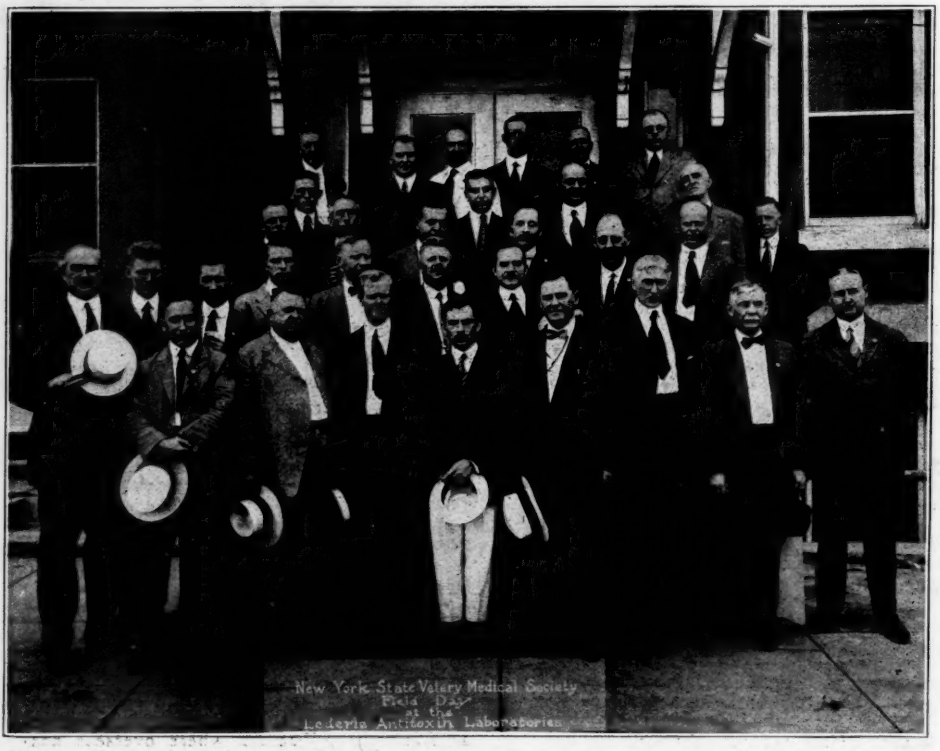
Benefit by Training

The enlisted veterinary corps offers two general fields of service for applicants; first, veterinary service with mounted troops of the army and other organizations having horses and mules attached to them; second, meat and dairy inspection service. Veterinary corps men, serving with troops, are always mounted, so this service offers the advantages and pleasures of the mounted branches of the army and gives a useful training at the same time. This work will offer a thorough training in veterinary hygiene and sanitation, veterinary first aid in the care and treatment of sick animals, horse shoeing and horse mastership. The experience thus gained will be of immense value to men who engage in farming or stock raising.

The meat and dairy inspection service also offers a practical training for men in the corps. Men who have received this training and who have demonstrated their efficiency in this work while in the army, have been in great demand upon the completion of their army service.

The corps has ample facilities for training its men in its field organizations, its completely equipped veterinary hospitals and in its meat inspection school which is maintained in one of the largest packing house centers in the United States.

NEW YORK VETERINARY MEDICAL SOCIETY



The New York State Veterinary Medical Association which held its convention July 23d to July 25th in Brooklyn, included in the program a trip to Pearl River, N. Y., to visit the Lederle Antitoxin Laboratories located there. About forty members participated in this outing, which according to the consensus of opinion was highly profitable to everyone present.

Demonstrations were given showing the preparation of the various biological products used by the veterinarians, a keen interest being especially manifested in the production of the clear anti-hog cholera serum which was demonstrated in detail from the beginning of the preparation until the finished product is obtained.

The members of the association came and departed in a special car. The ladies who accompanied the party were treated to an automobile ride along the picturesque Hudson Drive. All departed having spent a profitable day. A vote of thanks was extended to the laboratories for the pleasant and profitable time they had enjoyed through their courtesy.